# ATTACHMENT P

Los Alamos
NATIONAL LABORATORY
EST. 1943

***Environmental Protection & Compliance Division***
***Compliance Programs Group***
Los Alamos National Laboratory
PO Box 1663, K490
Los Alamos, NM 87545
505-667-0666

*Symbol:* EPC-DO: 19-302
*LAUR:* 19-28341
*Date:* AUG 20 2019

Dorothy Brown, 6WQ-PO
U.S. Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**Subject: NPDES Permit No. NM0028355, 2019 NPDES Permit Re-Application, Supplemental Package 3**

Dear Ms. Brown:

The purpose of this letter is to provide supplemental information, as discussed with the U.S. Environmental Protection Agency (EPA) on July 12, 2019, that is applicable to the renewal of the Los Alamos National Laboratory (LANL) National Pollutant Discharge Elimination System (NPDES) Permit No NM00283555. Specifically, enclosed with this letter are attachments that provide three notice of planned change letters, submitted to the EPA after the 2019 Permit Re-Application was submitted on March 26, 2019.

If you need additional information or have questions regarding the Permit Re-Application, please contact Karen Armijo, DOE at (505-665-7314) or Mike Saladen, Triad, at (505-665-6085).

Sincerely,

Taunia Van Valkenburg
Group Leader

TVV/MTS/JKG:jdm

Attachment(s): Attachment 1 LANL NPDES Permit No. NM0028355, Notice of Planned Change to Outfall 05A055 by Adding Second Electric Evaporator to the High Explosives Wastewater Treatment Facility (HEWTF)
Attachment 2 LANL NPDES Permit No. NM0028355, Notice of Planned Change to add Evaporative Sprayer Model 420B to SERF Evaporation Basins
Attachment 3 LANL NPDES Permit No. NM0028355, Notice of Planned Change to Outfall 03A160

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# ATTACHMENT 1

LANL NPDES Permit No. NM0028355, Notice of Planned Change to Outfall 05A055 by Adding Second Electric Evaporator to the High Explosives Wastewater Treatment Facility (HEWTF)

EPC-DO: 19-302

LA-UR-19-28341

Date: AUG 2 0 2019

Los Alamos
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EST. 1943

***Environmental Protection & Compliance Division***
Los Alamos National Laboratory
PO Box 1663, K490
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505-667-0666

*Symbol:* EPC-DO: 19-153
*LAUR:* 19-24181
*Date:* MAY 0 9 2019

Ms. Nancy Williams
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**Subject:** **Los Alamos National Laboratory, National Pollutant Discharge Elimination System, Permit No. NM0028355, Notice of Planned Change to Outfall 05A055 by Adding Second Electric Evaporator to the High Explosives Wastewater Treatment Facility (HEWTF)**

Dear Ms. Williams:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Triad National Security, LLC (Triad) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) of any physical alterations or additions to a permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. Report Requirements).

This notice of change is for the addition of a second evaporator to the High Explosives Wastewater Treatment Facility (HEWTF) at TA-16-1508. The HEWTF currently includes the option to discharge to Outfall 05A055 or to an ENCON electric evaporator that is rated for 24 gallons/hour. The facility intends to add a second ENCON electric evaporator that is rated at 40 gallons/hour. The purpose of the addition is to provide redundancy and increase the overall evaporation capability of the HEWTF. Attachment 1 provides a revised process schematic and water balance. Attachment 2 provides the specifications for new evaporator. This change is not expected to impact the permit conditions currently provided in the existing NPDES permit NM0028355.

Please contact Jennifer Griffin at (505) 667-6741 or Michael T. Saladen at (505) 665-6085 of the Environmental Compliance Programs Group (EPC-CP) if you have questions.

Sincerely,

Taunia S. Van Valkenburg
Group Leader

TVV/MTS/JKG:jdm

Attachment(s): Attachment 1 NPDES-FD-014-R1, Process Schematic & Water Balance for the High Explosives Wastewater Treatment Facility
Attachment 2 Specifications for the ENCON Evaporator

Copy: Sarah Holcomb, NMED/SWQB, sarah.Holcomb@state.nm.us (Hard copy, E-File)
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# ATTACHMENT 1

## NPDES-FD-014-R1, Process Schematic & Water Balance for the High Explosives Wastewater Treatment Facility

EPC-DO: 19-153

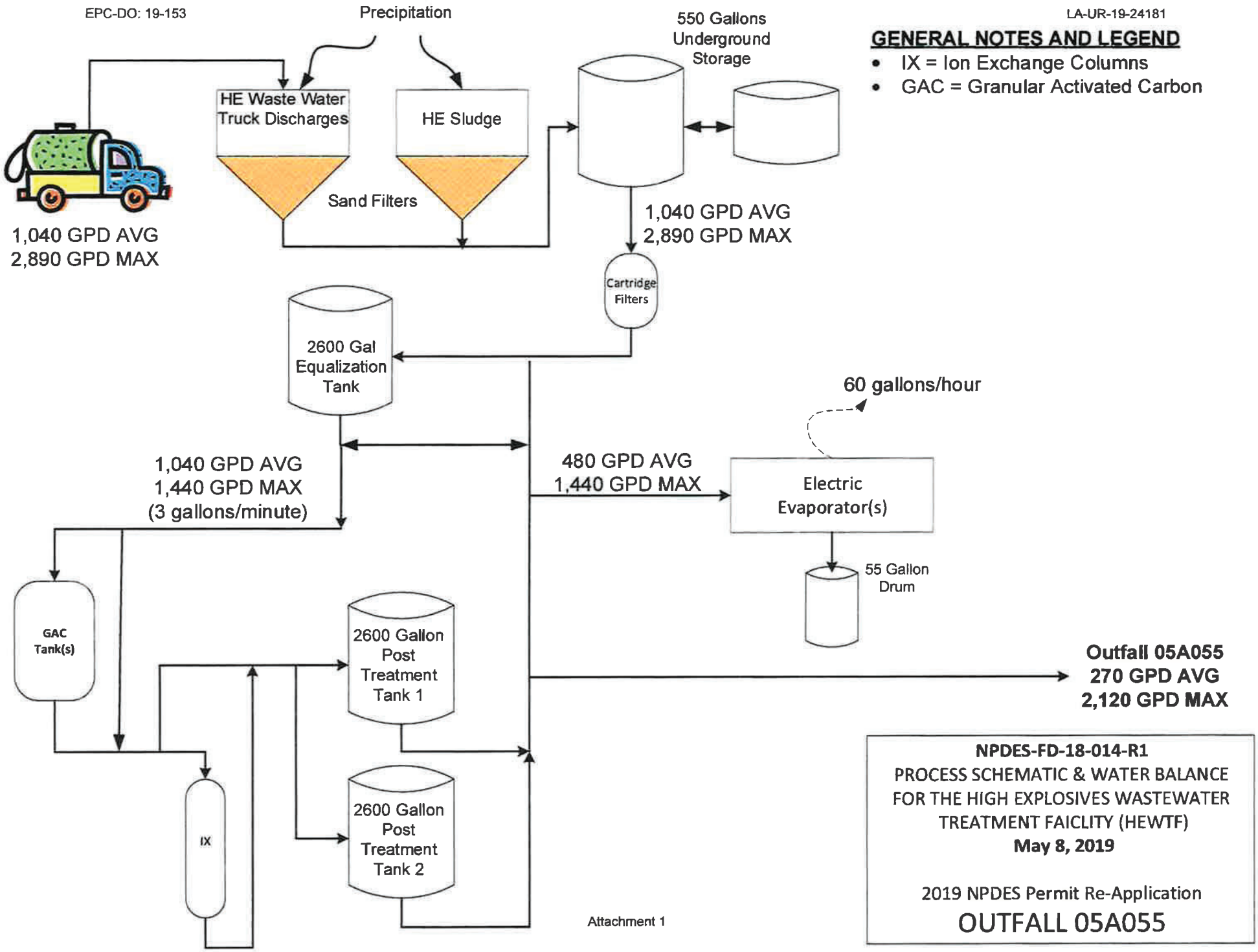
LA-UR: 19-24181

MAY 0 9 2019

**Date:** _____

EPC-DO: 19-153

LA-UR-19-24181




## GENERAL NOTES AND LEGEND

- IX = Ion Exchange Columns
- GAC = Granular Activated Carbon

**NPDES-FD-18-014-R1**
PROCESS SCHEMATIC & WATER BALANCE
FOR THE HIGH EXPLOSIVES WASTEWATER
TREATMENT FAICLITY (HEWTF)
**May 8, 2019**

2019 NPDES Permit Re-Application
OUTFALL 05A055

Attachment 1

Attachment 1

EPC-DO: 19-302

LA-UR-19-28341

# ATTACHMENT 2

## Specifications for the ENCON Evaporator

EPC-DO: 19-153

LA-UR: 19-24181

**Date:** MAY 0 9 2019

# THERMAL EVAPORATOR

## Cost Effective Wastewater Minimization

- ✓ Handles Different Wastewater Streams...Simultaneously!
- ✓ Dramatically Reduces Disposal Volume and Cost
- ✓ Eliminates Need to Discharge Wastewater
- ✓ Easy to Install and Operate
- ✓ Helps Reduce the Costs and Liabilities of Waste Disposal
- ✓ A Wide Variety of Heat Sources Including:
  - Natural Gas
  - Propane
  - Steam
  - #2 Fuel Oil
  - Diesel
  - Kerosene
  - Electricity
  - Waste Oil
  - Off-Spec Landfill Gas


**Evaporation System**
Exhausts Clean Water Vapor

**Distillation System**
Converts Wastewater to Clean Water

**www.evaporator.com**

ENCON
ENERGY CONSCIOUS INNOVATION

# High Quality Components and Superior Design

ENCON Evaporation and Distillation Systems are engineered to provide you with the most effective and economical method of wastewater minimization possible.

All ENCON systems are assembled with the highest quality components, ensuring years of trouble free operation.

Our unique heat exchanger design on our thermal units provides extremely efficient heat transfer, resulting in reduced fuel costs.

Key to the effectiveness of out ENCON Thermal Evaporators is the Mist Eliminator. This feature captures unwanted contaminants before exhausting, thus enabling you to comply with today's stringent emissions regulations (evaporation) or to return high quality water to your process (distillation).

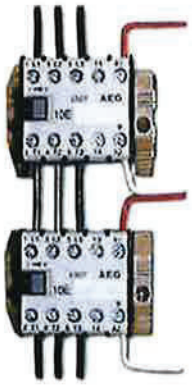
**Put Our Engineering and Regulatory Expertise to Work for You**

ENCON Evaporators provides the following services relative to evaporation/distillation projects:

- Free wastewater qualification analysis to ensure application feasibility
- Regulatory compliance and paperwork
- System design and compliance for hazardous waste applications
- PLC programming to optimize system automation
- Closed loop recycling evaluation and analysis

## PLC Control Panel

NEMA 4 PLC control panel with touch screen OIT provides readout of wastewater and heated air temperatures, mist pad pressure, plus alarm and operating conditions for maximum operator feedback. The OIT also includes a built-in cycle timer.



## Built-in Ethernet Port

Every control panel has a built-in ethernet connection, which allows for easy remote program modifications and/or troubleshooting of the system by ENCON personnel.


## Redundant Burner Contactors

Each burner has a duty contactor and a redundant contactor. This design ensures maximum safety by opening the redundant contactor in the event the duty contactor should fail electrically or mechanically.

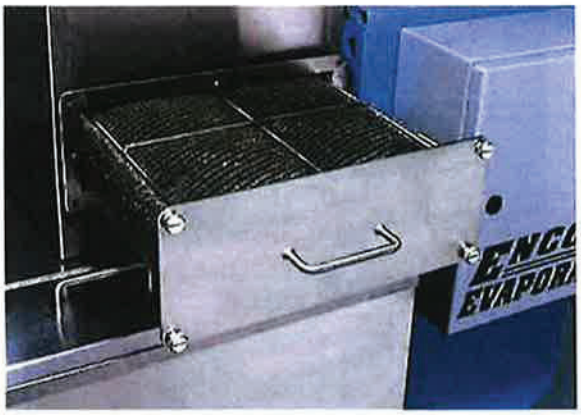
## Level Sensing

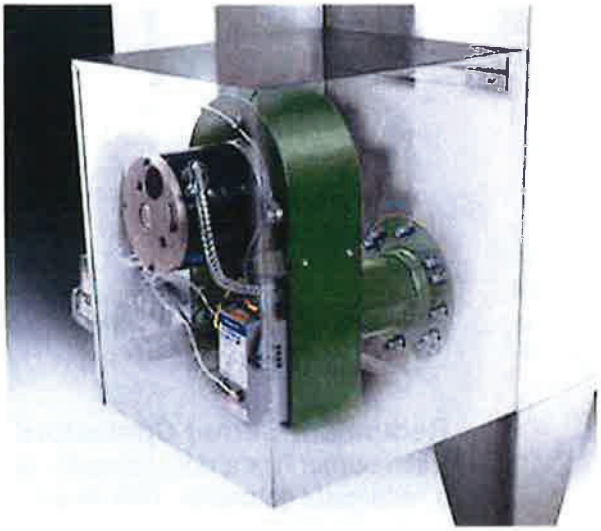
Tuning fork level probes provide reliable auto-filling and shutdown operations even in conditions of severe foam. The durable level probes are made of stainless steel for excellent corrosion resistance. Hastelloy level probes are available for highly corrosive applications.

# Result in Excellent Long Term Performance!!!

### Mist Eliminator System

The stainless mesh filter is designed for easy removal from its compression fit housing. The system is monitored for contaminant loading and airflow, which is interlaced to the control panel for maximum operator feedback.





### Forced Draft Burner

Each fuel heated system consists of a burner with: Honeywell controls; pressure gauge and gas volume meter for monitoring gas inlet conditions; airflow detection and lockout; spark ignition; redundant main valve and burner contactors for maximum safety. FM gas trains and gas flow transmitters are standard on larger systems. The stainless steel burner protection shroud is mounted on a track hanger for ease of removal and reattachment. Natural gas, Propane, Dual Fuel, Oil, Diesel, Waste Oil and Low $NO_x$ burners are available.

### Blower System

1725 RPM, TEFC Motor with Class B Insulation rated for high temperatures. Extremely quiet operation and as much as three times the longevity of 3450 RPM motors. Heavy gauge aluminum blower provides durability and longevity.

### Cleanout Flange

Large six inch cleanout with flange cover and a 1 ½" NPT fitting for pump connection and ease of residue removal.

**Before purchasing an evaporation or distillation system, challenge the vendor to explain their mist eliminator design.**

Over the years, evaporators have been notorious for exhausting contaminants, which can be detrimental to the environment. Effective mist capturing systems must have the following features in order to pass the ever tightening federal and state environmental regulations:

- Compression fit mist pad to capture entrained contaminants
- Mist pad rated to 10 microns or less to capture even the smallest droplets
- Stainless steel mist pad and housing to ensure long term integrity and aesthetics
- Adequate buffer zone between the water level and mist pad, to allow fallback of the contaminants
- Monitoring of mist pad loading to ensure consistent airflow and evaporation rates
- Easy removal of the mist pad to minimize manpower requirements

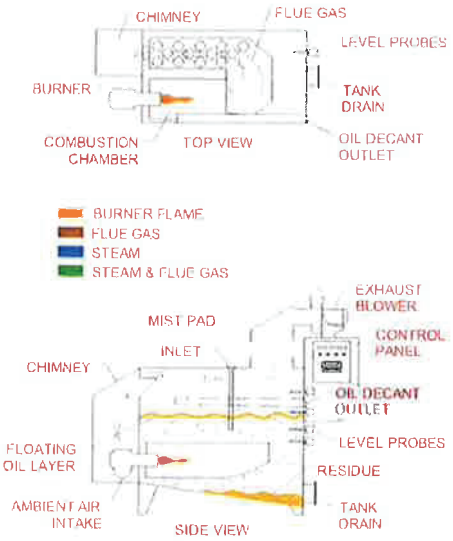
## Typical Operation

1. Wastewater is either pumped or gravity fed into the system through a 1" NPT fitting on lid.
2. When the wastewater being fed into the evaporator has covered the low level probe for thirty seconds, the heat source will be enabled. Wastewater will continue to feed until it reaches the auto level probe.
3. The burner(s) fire into the combustion chamber and the hot gases travel past the vertical tubes inside the heat exchanger until they reach the insulated chimney outside the evaporator tank (see Exhaust Scenarios).
4. The wastewater is heated to boiling and is driven off as clean water vapor.
5. As the water vapor is driven off, the liquid level will gradually fall below the auto level probe. After a set time period, the system will refill itself up to the auto level probe.
6. This process will continue until either the water reaches the high temperature set point or the cycle timer counts down to zero.

***We Encourage You to Speak to Our Valued Clients about the ENCON Systems and Our Superior Customer Service***

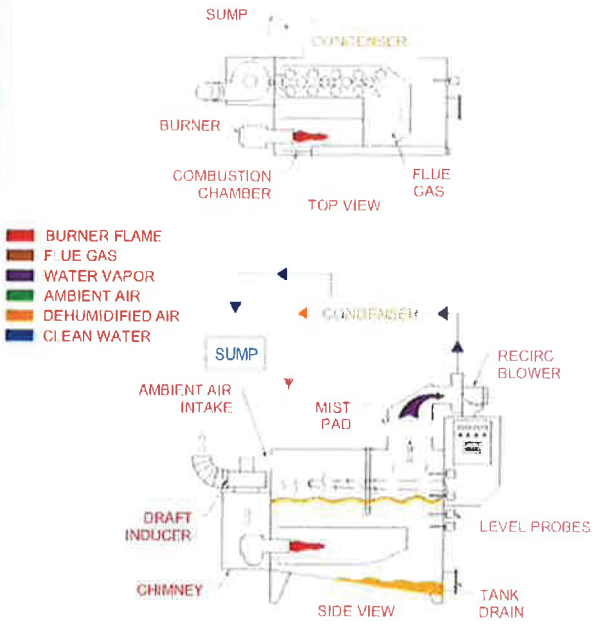
# Exhaust Scenarios

## Evaporation System




The flue gases are pulled back into the evaporator, mixed with the ambient air and drawn across the surface of the boiling water. The exhaust blower pulls the combined steam and gases through the mist eliminator and pushes them up through the stack and outside the building.

## Distillation System




The flue gases are not pulled back into the evaporator. Instead, they are vented separately up their own stack. The recirculation blower pulled the steam through the mist eliminator and pushed it through the condenser. The clean water is directed to a sump and the dehumidified air is returned to the system.

**ENCON Evaporators**
1368 Hooksett Rd, Unit 9 • Hooksett, NH 03106 USA
T 603-624-5110 • F 603-627-9520
www.evaporator.com • sales@evaporator.com

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# ENCON ExxVx-40 SPECIFICATIONS

| PHYSICAL | EVAPORATION UNIT | DISTILLATION UNIT |
|---|---|---|
| Dimensions : | 98" x 52" x 84" (L x W x H) | 98" x 64" x 84" (L x W x H) |
| Weight (Empty): | 1400 lbs (empty) / 1800 lbs (crated) | 1800 lbs (empty) / 2300 lbs (crated) |
| Condenser Size: | N/A | 6"Ø x 30"L (2" FNPT chill water fittings) |
| Vent Stack Diameter: | 6" OD | N/A |
| Blower Volume: | 780 CFM, 3/4 HP, 1725 RPM | |
| Inlet Pipe Diameter: | Fluid - 1" FNPT | |
| Cleanout Diameter: | 6" Flanged Cap with 1.5" FNPT fitting | |
| Heating Elements: | Three 40 kW low watt density immersion heaters | |
| Tank Capacity: | 255 gallons @ Low level, 316 gallons @ Auto-run level, 353 gallons at High level | |
| Tank Bottom: | 8° downward slope to a 6" cleanout flange | |

| UTILITIES | EVAPORATION UNIT | DISTILLATION UNIT |
|---|---|---|
| Electric Requirements: | 480 VAC, 3 Phase, 150 Amp Draw (not available in 240 VAC) – requires larger circuit size | |
| Cooling Water: | N/A | 60 gallons per minute @ 90°F (42 tons) |

| FABRICATION | 316SS VERSION | 6% MOLY VERSION | HASTELLOY VERSION |
|---|---|---|---|
| Tank: | 316L Stainless, 14 ga | 6% Molybdenum, 14 ga | Hastelloy, 14 ga |
| Heating Elements: | 316L Stainless Sheath | Titanium Sheath | Titanium Sheath |
| Mist Eliminator Pad: | 316L Stainless | | |
| Skins and Lids: | Polished 304 Stainless Steel, 18 ga | | |
| Insulation: | All 6 sides, rated to 450F, R = 4.3 | | |

| CONTROLS | ALL UNITS |
|---|---|
| Temperature Controls: | Four (4) channel analog card with 2 Type J Thermocouples:<br>Fluid Concentration Monitoring & Element Intake/Redundant Low Level Shut-off |
| Control Inputs: | 3 Frequency Shift Level Probes and Mist Pad Differential Pressure Transducer |
| Remote Connection: | Ethernet port for direct connection by ENCON Engineers |
| Control Panel: | UL Listed, NEMA 4, PLC Control Panel |
| | Touch screen Operator Interface Display with messages for normal & alarm conditions. |
| | Main power selector switch |
| | Indicators (2) – Main Power, Heater(s) |
| | |

| QUALITY | ALL UNITS |
|---|---|
| Leak Test: | Dye penetrant test performed on tank welds |
| I/O Simulation: | All I/O and controls are fully tested to insure accuracy/functionality |
| Warranty: | One Year for Parts and Workmanship Issues |

Specifications subject to change without notice


ENCON

**ENCON Evaporators**
**www.evaporator.com**

1368 Hooksett Rd., Unit 9, Hooksett, NH 03106 USA
Tel. (603) 624-5110 Fax: (603) 627-9520
Email: sales@evaporator.com



Printed in the USA
Rev 3

ENCON

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# STANDARD FEATURES OF ENCON EVAPORATORS

(8-400 GPH)

- Ethernet Hub that allows for remote connection to PLC by **ENCON** Service Engineers.
- On-board diagnostics that monitor level controls for correct operation and system shutdown.
- OIP Display showing Fluid Temperature, Air/Heating Element Temperature, Mist Pad Condition.
- Normal operation and alarm conditions are displayed on interface panel as text messages.
- Gas volume meter to monitor system throughput on gas fired systems.
- Low Watt Density Heating Elements on electric systems.
- Mist Eliminator System to capture entrained water droplets. Interfaced to the PLC and will shut down the system when the pad requires cleaning.
- Primary Low-Low Liquid Level shutdown of heat source with tuning fork level probe.
- Redundant Low-Low liquid level shutdown with thermocouple and temperature controller.
- High AutoFill Liquid Level to initiate and stop fill sequence.
- High-High Liquid Level shutdown. Serves as redundancy for High AutoFill Level.
- Insulation rated at up to 450F on all six (6) sides.
- 4" OR 6" Cleanout with six (6) and eight (8) bolt flanges for ease of removal and tank cleaning.
- 1.5" NPT Fitting in the flange plate to connect a residue removal pump.
- Outer Skins constructed of 304 Stainless Steel.
- Front panel Oil Weir and Decanting System.
- Control Panel that meets **NEMA 4** standards. Panel includes easy to read display with text messaging.

Mechanical Vapor Compression (MVC) Evaporators  Waste Oil Evaporators
Thermal Evaporators  Drum Evaporators / Dryers

# ENCON

ENERGY CONSCIOUS INNOVATION

## PROCESS DESCRIPTION OF ENCON EVAPORATORS

1. Wastewater is collected in primary holding tank.

2. Water is either pumped or gravity fed into evaporator through 1" NPT fitting on lid.

3. There are three (3) level controls in the standard auto-fill system –

   a) low level controls heating element(s) operation, on and off
   b) auto-fill level initiates and ends fill sequence, through pump or actuated ball valve
   c) high level is a redundancy for auto-fill level

4. As the fluid flows into the evaporator and reaches the low-low level the heating elements will be energized.

5. Fluid will continue to flow until it reaches the auto-fill level. Pump or actuated ball valve will be deactivated.

6. As fluid comes to a boil and begins the evaporation process, the liquid level will drop down ~1.5". Pump or actuated ball valve will be energized and more fluid will be fed into the Evaporator.

7. This process will continue until either the fluid temperature controller reaches the set point or the cycle timer counts down to zero.

8. When activated, the heating elements will energize and heat the wastewater to its boiling point. At this time, there are two (2) ways the flue gases and steam may be ducted:

   a) If customer has chosen to vent to atmosphere, the blower pulls the steam through the 10 micron Mist Eliminator and pushes it up through the stack to the outside.

   b) If customer has chosen the "closed loop" condenser package, The blower pulls the steam through the Mist Eliminator and pushes it through the connection from the blower to the inlet side of the condenser which is horizontally directed on the shelf that is mounted on the back side of the evaporator tank.

ENCON EVAPORATORS*1368 HOOKSETT ROAD, UNIT #9*HOOKSETT,, NH 03106*603/624-5110*603/627-9520FAX

# ATTACHMENT 2

LANL NPDES Permit No. NM0028355, Notice of Planned Change to add Evaporative Sprayer Model 420B to SERF Evaporation Basins

EPC-DO: 19-302

LA-UR-19-28341

Date: AUG 2 0 2019

Los Alamos
NATIONAL LABORATORY
EST. 1943

*Environmental Protection & Compliance*
***Division***
Los Alamos National Laboratory
PO Box 1663, K490
Los Alamos, NM 87545
505-667-0666

*Symbol:* EPC-DO: 19-163
*LAUR:* 19-24630
*Date:* MAY 2 3 2019

Ms. Nancy Williams
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**Subject: Los Alamos National Laboratory, National Pollutant Discharge Elimination System, Permit No. NM0028355, Notice of Planned Change to add Evaporative Sprayer Model 420B to SERF Evaporation Basins**

Dear Ms. Williams:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the Nuclear Security Administration (NNSA) and Triad National Security, LLC (Triad) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) of any physical alterations or additions to a permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. Report Requirements).

This notice of change discusses the use of a high volume spray evaporator at the Sanitary Effluent Reclamation Facility (SERF) evaporation basins located at Technical Area 60 Sigma Mesa. The basins are used to evaporate secondary wastewater generated at the SERF and the high volume spray evaporator will be used to increase the rate of evaporation at the basins by mechanically fracturing the water into 100 – 400 micron particles and lofting them into the air. There are currently five smaller floating spray evaporators in operation at the basins that serve the same function. This change does not impact the effluent discharged to the outfall or the permit conditions currently provided in the existing NPDES permit NM0028355.

Please contact Jennifer Griffin at (505) 667-6741 or Michael T. Saladen at (505) 665-6085 of the Environmental Compliance Programs Group (EPC-CP) if you have questions.

Sincerely,

Taunia S. Van Valkenburg
Group Leader

TVV/MTS/JKG:jdm

Attachment(s): Attachment 1 NPDES-FD-005-R4, Process Schematic & Water Balance for the Sanitary Effluent Reclamation Facility (SERF)
Attachment 2 Specifications for the 420 Evaporator Operator Manual

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epc-correspondence@lanl.gov, (E-File)
adesh-records@lanl.gov, (E-File)

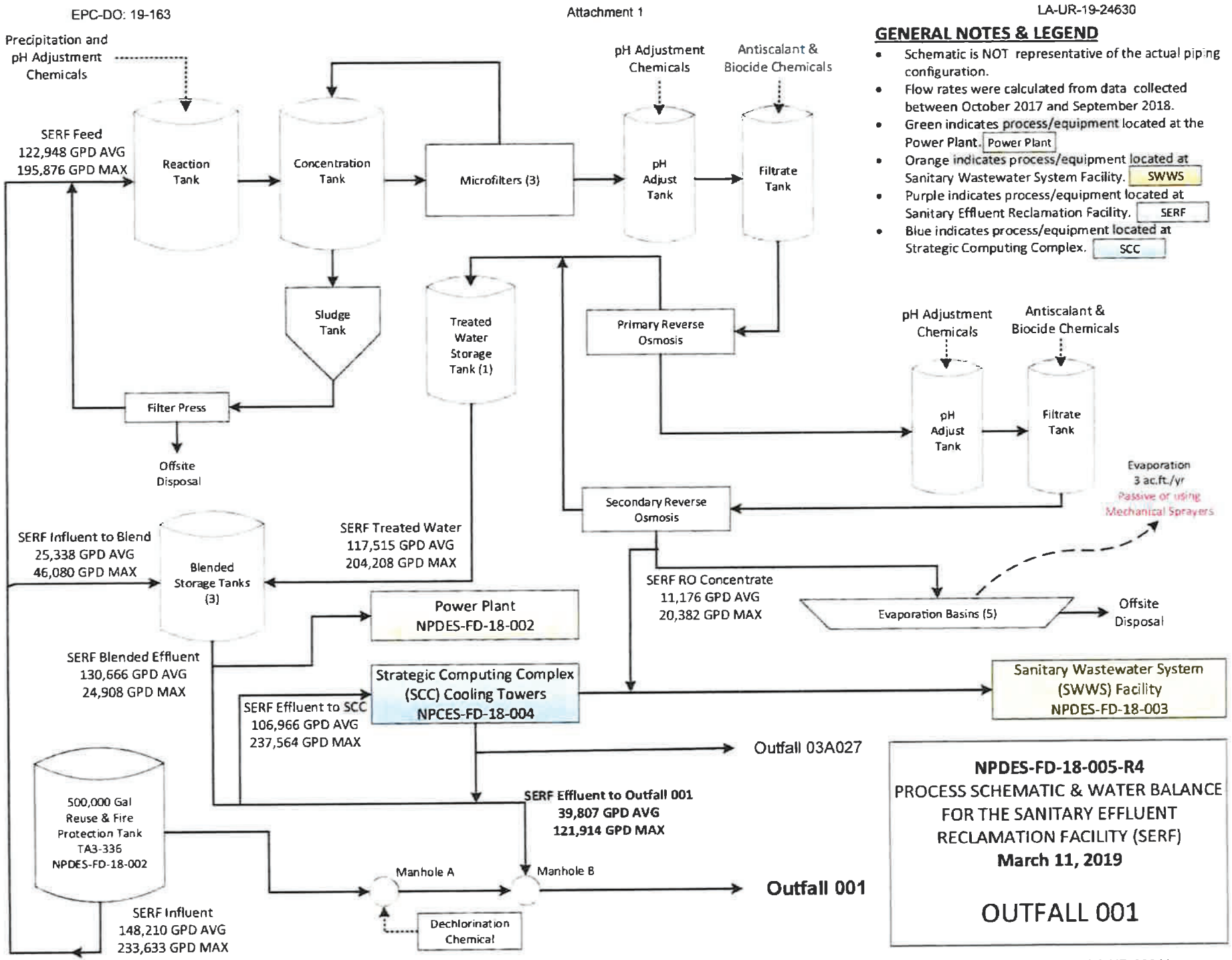
# ATTACHMENT 1

NPDES-FD-005-R4, Process Schematic & Water Balance
for the Sanitary Effluent Reclamation Facility (SERF)

EPC-DO: 19-163

LA-UR-19-24630

Date: MAY 2 3 2019




## GENERAL NOTES & LEGEND

- Schematic is NOT representative of the actual piping configuration.
- Flow rates were calculated from data collected between October 2017 and September 2018.
- Green indicates process/equipment located at the Power Plant. Power Plant
- Orange indicates process/equipment located at Sanitary Wastewater System Facility. SWWS
- Purple indicates process/equipment located at Sanitary Effluent Reclamation Facility. SERF
- Blue indicates process/equipment located at Strategic Computing Complex. SCC

**NPDES-FD-18-005-R4**
PROCESS SCHEMATIC & WATER BALANCE FOR THE SANITARY EFFLUENT RECLAMATION FACILITY (SERF)
**March 11, 2019**

OUTFALL 001

# ATTACHMENT 2

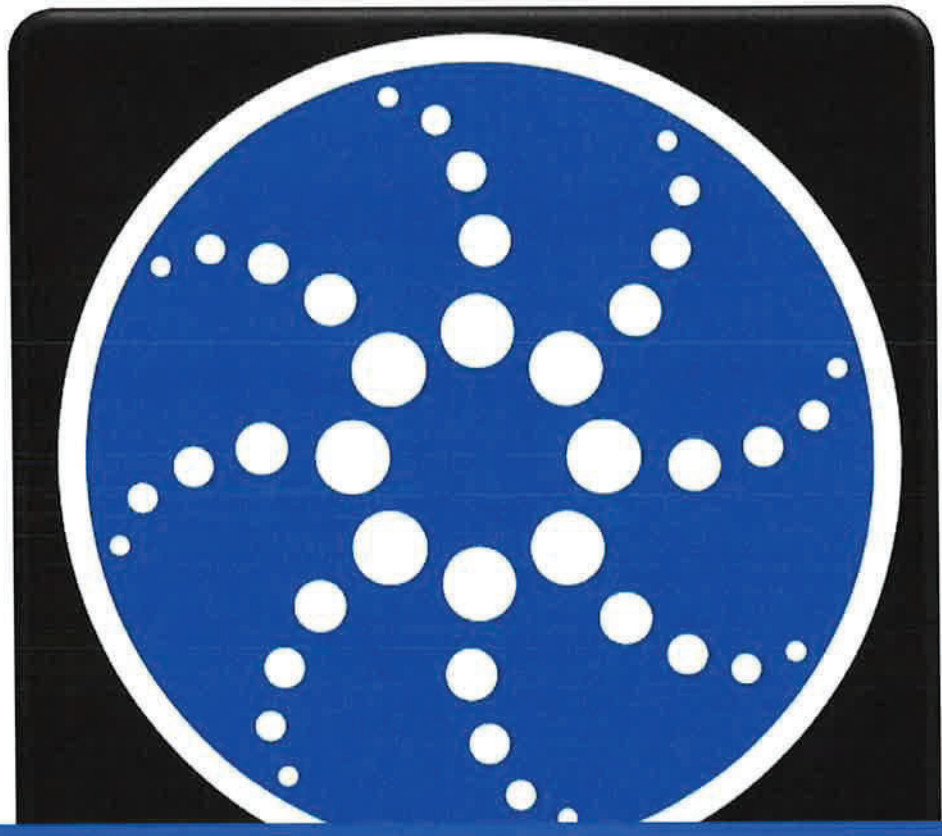
Specifications for the 420 Evaporator Operator Manual

EPC-DO: 19-163

LA-UR-19-24630

Date: MAY 2 3 2019

SMI Evaporative Solutions
EVAPOR.COM



# OPERATING AND PARTS MANUAL

# 420

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## INTRODUCTION

Your SMI Evaporative Solutions 420 Series Evaporator is one of the most technically advanced yet simple evaporation products in existence.

Thousands of hours of research, testing, and field use have gone into the design and improvements to the 420 Evaporator. SMI Evaporative Solutions is dedicated to providing our customers with superior quality products for optimum trouble-free operation.

It is very important to have a full understanding of the contents of this manual prior to assembly and operating the 420 Evaporator. This manual contains information to help you operate your 420 Evaporator in a safe manner to obtain optimal performance.

## GENERAL DESCRIPTION

The 420 Series Evaporator uses a specially designed fan to mechanically fracture water into 100-400 micron particles while simultaneously lofting them into the air. Flow rates have been optimized for efficient evaporation of the water particles, eliminating water particle fallout while producing high evaporation rates. Our goal is 100% evaporation with minimal drift.

The 420 Series Evaporator is offered in two basic mounting configurations: Floating (420F) and Stationary Boom (420B). Both designs feature simple yet rugged construction from heavy duty components. The mounting frames are offered in galvanized carbon steel, painted steel, and stainless steel depending on the application.

Because the fan atomizes the water particle, the units can operate at water pressures as low as 20 psi (1.4 bar). The orifices in the spray manifold are sized to allow large particulate to pass through without pre-filtering. The fan is constructed of type 316 stainless steel, which allows it to be used with a wide range of contaminants and water chemistry. A coated stainless steel fan is also available for special applications.

## TRAINING

The 420 Series Evaporators should be operated and maintained by personnel who have received formal safety training by a qualified instructor. Knowledge of the equipment along with general safety and operating procedures could prevent mishaps or injury and will make evaporation more effective. Each user should develop custom training programs for your specific application.

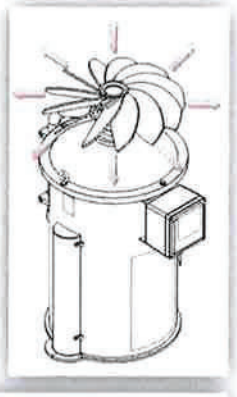
All personnel associated with this equipment should receive this training. They should have a thorough understanding of the safety procedure as well as how to operate and handle problems that may occur. They should know where the manual is located and how to use it for reference.

## SAFETY

SMI Evaporative Solutions recommends that the following steps be taken when working on or near a 420 Series Evaporator. We recommend that each site develop their own Safe Operating Procedures that at a minimum include:

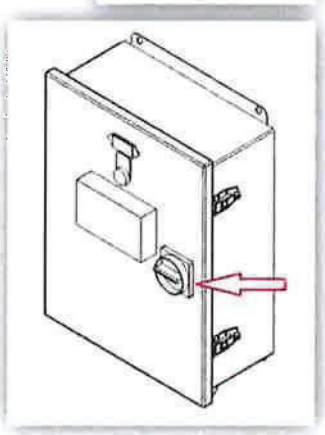
1. ***Never stand beside the fan while in operation***. Particulate and ice chips (cold weather operation) are thrown from the blade due to the high centrifugal forces involved.
2. This manual should be read by all personnel associated with evaporation.
3. All personnel should be familiar with the machine and versed in your area's safety procedures.
4. Moving the machine while it is operating should be avoided. If it can't be avoided, use extreme caution.
5. Do not attempt to remove residue or ice while the machine is operating. The machine should be removed from service for maintenance.
6. The fan is very delicate. Care should be taken to avoid damaging the fan. Damage to the fan blade can cause the fan to become out of balance resulting in damage to the equipment or injury to personnel.
7. Be cautious of all hazards in the area around the equipment including: wet, slippery surfaces, high voltage power cords, equipment pinch points, and contaminant drift.
8. Use protective clothing, eye wear, head gear, and hearing protection as a precaution when working near the equipment.
9. Determine if appropriate signage or fencing of machine is needed and in place.

## GETTING TO KNOW YOUR EVAPORATOR



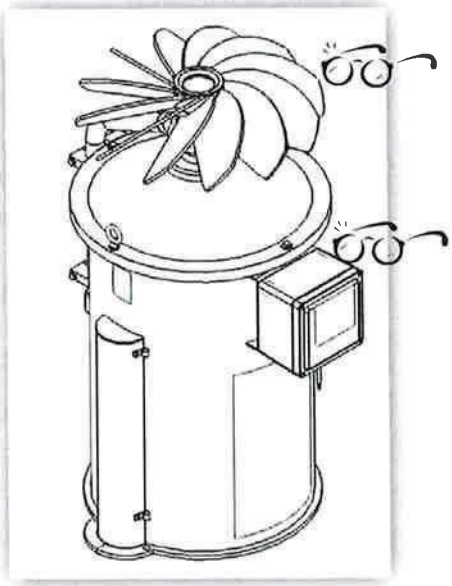
The 420 Series Evaporator is a simple machine that will provide years of use if maintained safely and properly. The units feature a high speed cast stainless steel fan that rotates at speeds up to 3,600 RPM. Because of the high speeds involved, it is important to keep the blades of the fan free of solids – salts, ice, or other debris – to keep the fan properly balanced.

By nature of the design, the fluid sprayed against the blade will propel from the blade due to centrifugal force. The fan is left open to atmosphere for proper dispersion of particle into the atmosphere. Caution should be taken whenever working near the equipment while operating. SMI recommends that each site develops safe operating procedures for working with this equipment. At a minimum, the user should follow these basic steps:



- Prior to inspecting or servicing the equipment, **the equipment panel should be turned Off, Power Locked out, and a tag applied stating that the machine is being inspected or serviced.**

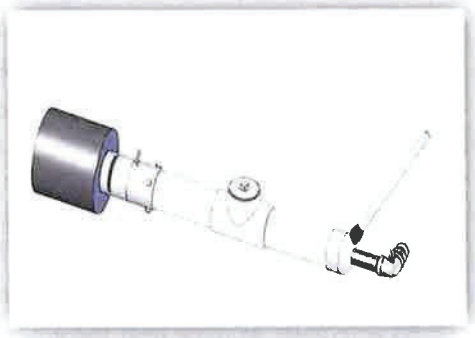
- Once locked out, the machine should be moved to a safe position for inspection or service. A 420 Boom mount can be lowered in either direction for service. See the steps outlined in the Installation section. A 420 Floater should be retrieved from the pond and brought to shore.
- Inspect the blade for solids build up. If solids are present, they should be removed with a high pressure washer. A heated high pressure washer works well to loosen and remove all debris.
- Inspect the Spray Manifold for clogged nozzles or damage. If clogged, clean with a high pressure washer. It may be helpful to remove the plug to flush solids out of the spray.
- Rotate the fan blade to feel for bearing wear. Excessive build-up of solids can cause bearing damage.
- Check the vibration sensor cord for damage. If the vibration switch has tripped and the fan blade is clear of solids without signs of damage, open the protective housing to inspect the vibration switch.



420F (Float Models) are equipped with a submersible pump and with junction box to terminate the motor leads and vibration switch leads with the supply cords routed from shore. The junction box, cords, and pump should be inspected periodically as part of your maintenance program.

To inspect the submersible pump:

- Remove the pump from the water by lifting it by its chains.
- Inspect the housing, power conduit, and plumbing for damage
- Inspect the pump housing inlet filter for clogs.



If the pump housing inlet filter is clogged with debris, or if you feel the pump output is insufficient, the inlet filter and pump inlet should be removed. To remove the filter from the housing, you will need to:

- Unscrew the filter from the pump housing
- Remove the cleanout cap on the T.
- Pressure wash the pump housing filter, pump inlet thru the cleanout T to remove debris.
- Inspect the pump inlet (shaded area in image) and clean as necessary, this is visible thru the cleanout T

- Re-assemble in reverse order.

Though the Evaporator fan blade, control panel and pump (when equipped) are the critical components for proper evaporator operation, you should periodically clean, inspect, and maintain your entire evaporator for long life and to limit down time.

## POSITIONING OF EVAPORATOR

Several factors should be considered when choosing the location of evaporators. Consider the containment area size, contaminate type, prevailing wind direction, and containment areas surroundings. SMI Evaporative Solutions can assist you with developing a site plan prior to installation to maximize the performance of your evaporation system.

Ideally, water and power supply lines should be 150' to 200' upwind from a 420 Evaporator. With the electrical control panel and water shut off at a sufficient distance from the unit, the operator can start and stop the machine while staying dry and maintaining a safe distance from the rotating evaporator blade.

### 420B Series Evaporator Position

A 420B Series Evaporator should be set up within the containment area. This is so any un-evaporated liquid and contaminates are collected and concentrated within the containment area (pond or land area designated and permitted for containment).

Where multiple Evaporators are used, units should be placed at 50' to 100' intervals along a line perpendicular to the prevailing winds.

### 420F Series Evaporator Position

The 420F Evaporator should be set up in the center of the pond. This is so any un-evaporated liquid and contaminates are collected and concentrated within the containment area (pond or land area designated and permitted for containment).

Where multiple Evaporators are used, units should be placed at 50' to 100' intervals along a line perpendicular to the prevailing winds

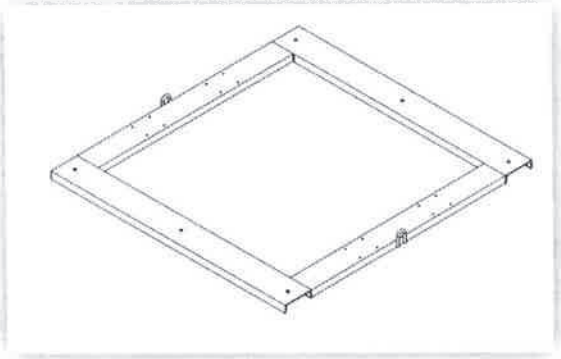
# INSTALLATION

## 420B SERIES EVAPORATORS

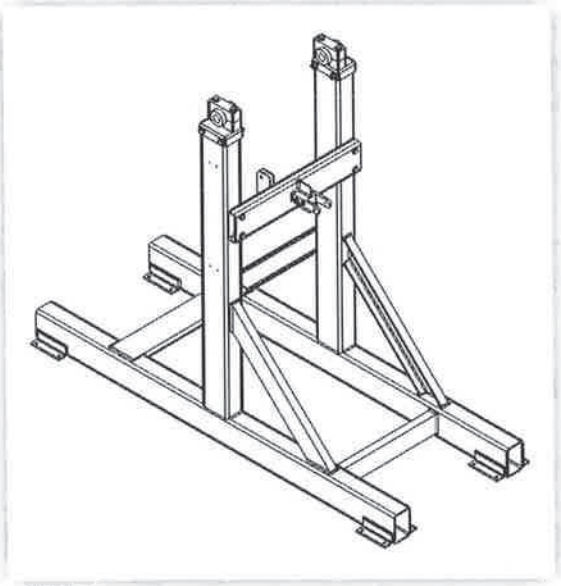
SMI Evaporative Solutions 420B Series Evaporators are shipped disassembled so they can fit on common flat beds, in containers, or in a box truck. The machine is pre-assembled as sub-assemblies that can be assembled onsite by following these steps.

### 420B SERIES COMPONENT SUB-ASSEMBLIES

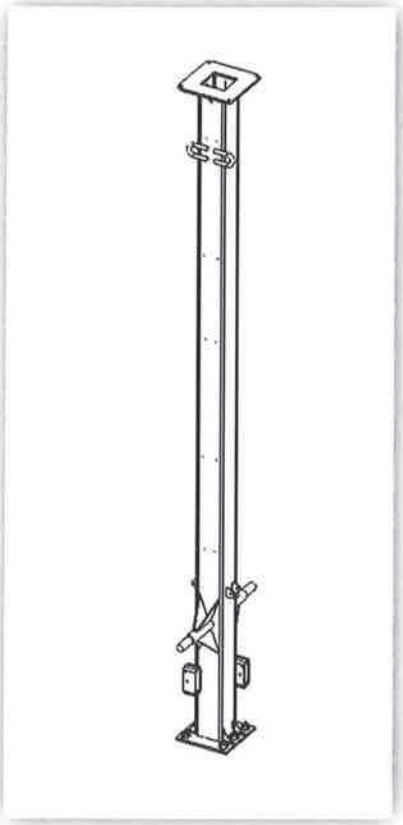
The equipment typically ships as sub-assemblies to conserve shipping space. The sub-assemblies vary depending on order size and shipping method. Common sub-assemblies are:



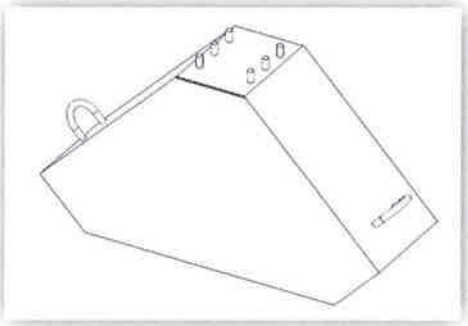
420B Base Platform



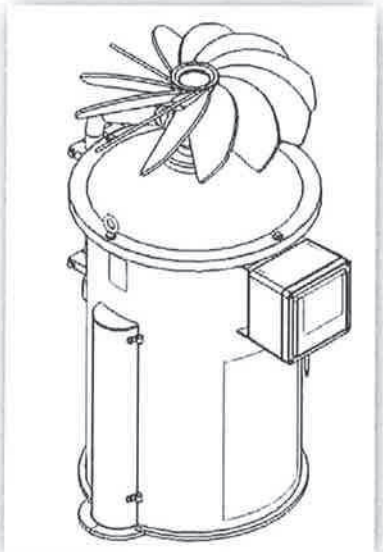
420B Upright Frame



420B Boom

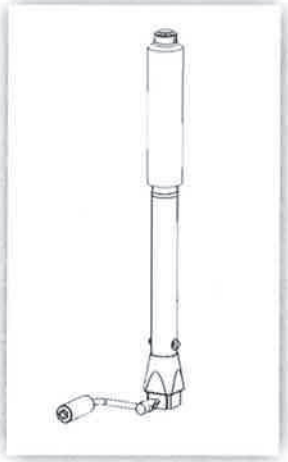


420B Counter-weight



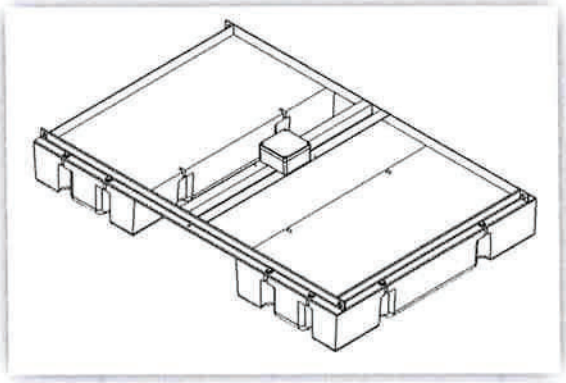
420 Evaporator Head Assembly

420B Jack Assembly



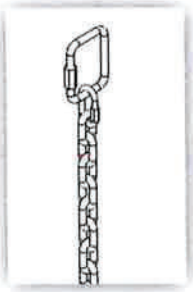
420B Fastener Kit

Hoses, power cords, control panels and other accessories will also be packaged with the equipment. These components vary depending on equipment type. SMI Evaporative Solutions offers several machine control options. If you have ordered a 420B Boom Series Evaporator with submersible pump, your order should also include:



420B Float Pump Pontoon Assembly

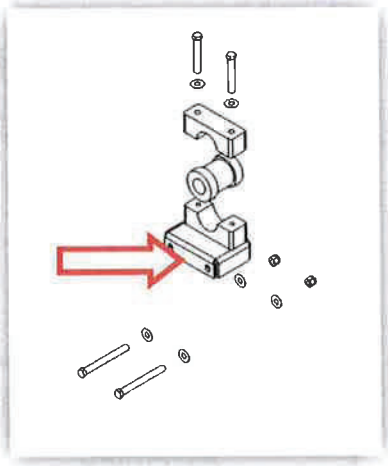
420B Float Pump Assembly



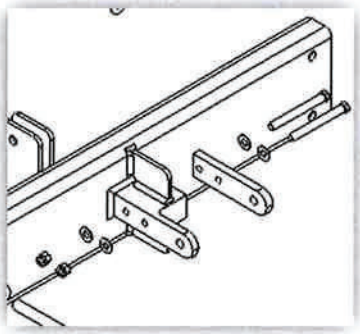
420B Float Pump Chain Assembly

To assemble the 420B Series Evaporator, begin by gathering the components and locating the Base Platform on a level surface – working location preferred. Refer to the Parts List drawings for appropriate part numbers and fasteners.

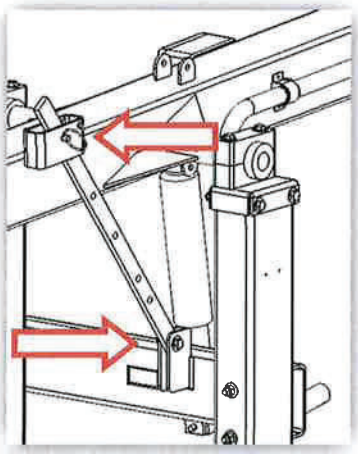
- Prepare a 9ft x 9ft (2.7m x 2.7m) pad for the base frame. The frame should be level within 5°.
- Place the Upright Frame on the Base Platform and assemble with included fasteners.
- Locate the bushing blocks mounted to the top of the Upright Frame posts and remove the two screws from the top block. Remove the top block and bushings.
- Locate the Boom and assemble the bushings to the Boom.
- Lower the Boom onto the bushing blocks.
- Replace the upper bushing blocks and assemble with the fasteners previously removed.
- Locate the Jack Assembly.



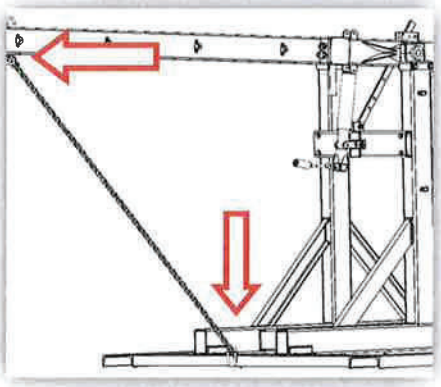
- Assemble the rod end (opposite the handle end) to the boom with the appropriate fasteners detailed in the Parts List drawings.
- Remove the jack pivot tab from the Upright Frame Assembly (as shown in illustration to the right).
- Place the Jack Assembly trunnion shaft into the pivot block and replace the pivot tab, securing with the included fasteners.
- The boom should now be stabilized by the jack. The jack can be used to raise and lower the boom.
- Locate the Lock Bar, Lock Bar Pin, and fasteners to attach the lock bar to the Upright Frame



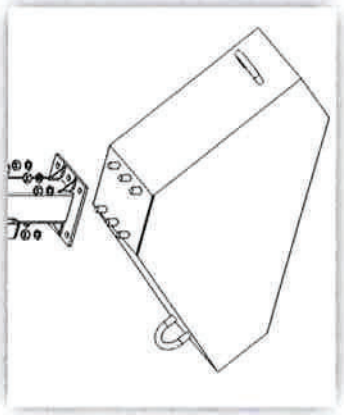
- The Lock Bar attaches to the Upright Frame through a slotted hole. Before attaching to the Upright Frame, locate the hole at the opposite end and attach the Lock Bar to the Boom by placing the Lock Bar inside the Boom tube and Inserting the Lock Bar Pin through the Boom tube and the Lock Bar. Once the upper end is pinned, Swing the Lock Bar into position to attach to the Upright Frame tabs. Use the Jack to raise or lower the boom to align the Lock Bar slot with the Upright Frame tab.



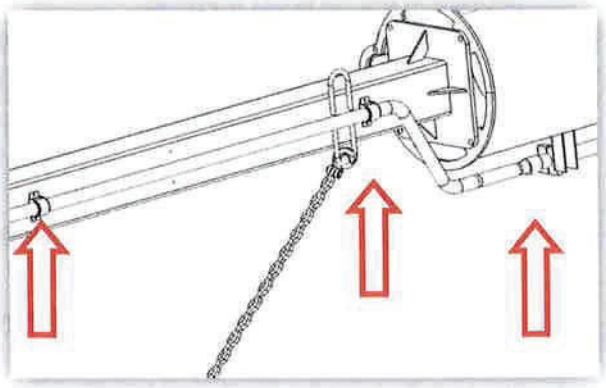
- With the Jack mounted and the Lock Bar pinned into position, locate the long safety chain that will stretch from the boom near the Head mounting flange back to the Base Platform. Hook the chain to the Boom and Platform through the loops provided. This step is necessary to prepare for installing the concrete counter-weight.
- Locate the Concrete Counter-weight and lift with a machine to mount it to the Boom flange (short end of Boom from pivot). Attach the Counter-weight with the included fasteners. Do not remove the machine supporting the counter-weight.



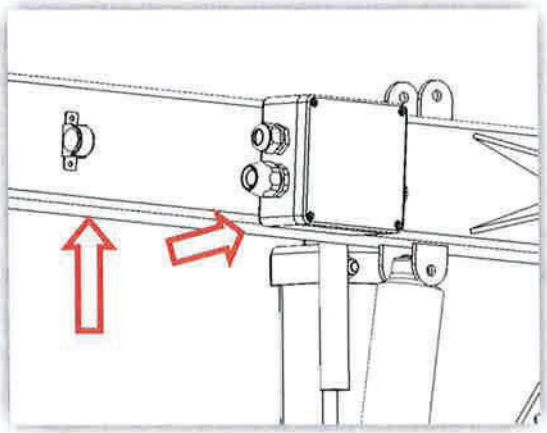
- Locate the Head Assembly. Lift the Head Assembly into Mounting Position. Position the Head Assembly on the Boom Flange so that the motor conduit is oriented on the same side of the boom as the Junction Box. The boom is shipped with vibration clamps for water hose and motor conduit. There are typically four motor conduit clamps and three water hose clamps. The motor conduit clamps are typically smaller diameter clamps than the water hose.



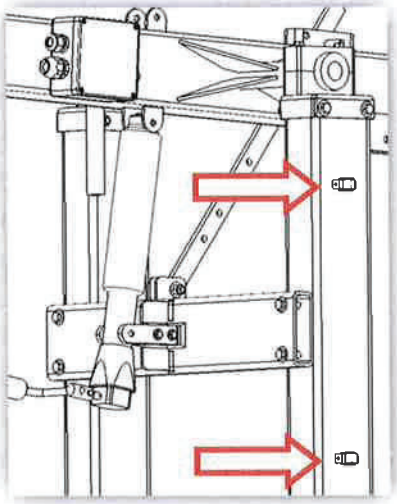
- Once the Head Assembly is secured with the supplied fasteners, the water hose can be attached.
- Locate the water hose and route it through the hose clamps. Attach the water hose to the spray manifold on the Head Assembly.
- With the water hose assembled, the Evaporator is now ready to be wired.
- All electrical work should be performed by a certified electrician and completed to satisfy electrical codes specific to the location and equipment type.



- Locate the Fan Motor conduit and route the conduit through the vibration clamps.
- Locate the Junction box and remove the cover.
- The junction box is supplied with a water-tight conduit fitting and a water-tight cord fitting for the vibration switch. Insert the conduit into the conduit fitting and secure the conduit with the fitting cap.



- Route the Vibration switch cable along the conduit and into the water-tight cord grip. Secure the vibration switch wire with the cord grip fitting.
- Terminate the junction box to the supplied electrical schematics.
- Locate the main power cable (from Boom Junction box to Control Panel) and route it through the clamps located on the Upright Frame.
- Terminate the power supply cord in the junction box to the supplied electrical schematics.
- Close and seal the junction box.
- Continue to wire the power supply cord to the control panel before connecting the control panel to power. Once the control panel is wired to the evaporator power supply cord, connect it to the power source (with power source locked out).

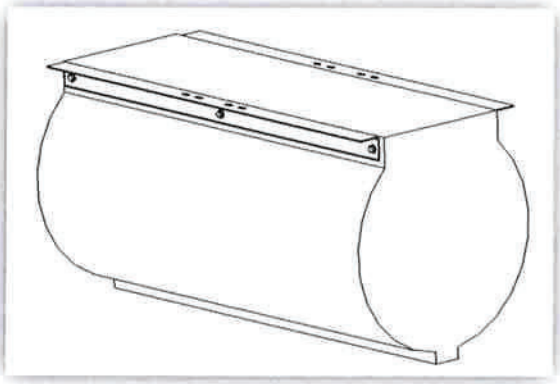


## 420F SERIES EVAPORATORS

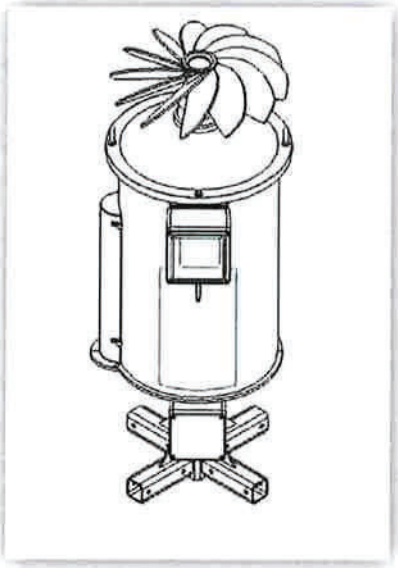
SMI Evaporative Solutions 420F Series Evaporators are shipped disassembled so they can fit on common flat beds, in containers, or in a box truck. The machine is pre-assembled as sub-assemblies that can be assembled onsite by following these steps.

### 420F SERIES COMPONENT SUB-ASSEMBLIES

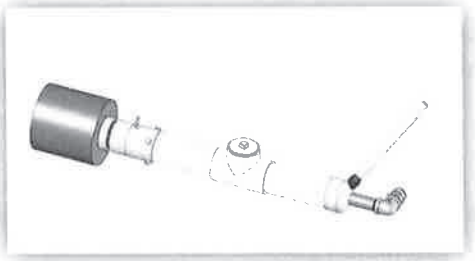
The equipment typically ships as sub-assemblies to conserve shipping space. The sub-assemblies vary depending on order size and shipping method. Common sub-assemblies are:



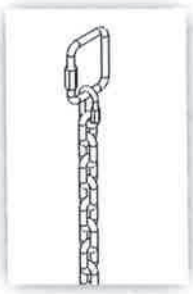
420F Pontoons (4x)



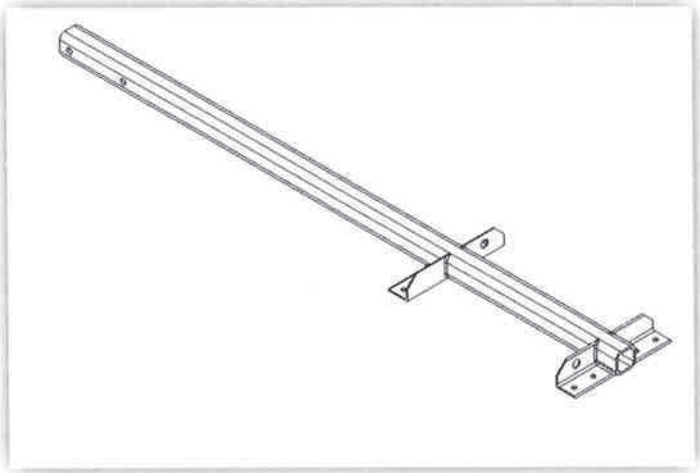
420F Evaporator Head Assembly



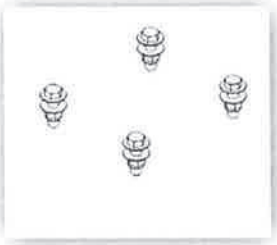
420F Pump Assembly



420F Pump Chain Assembly

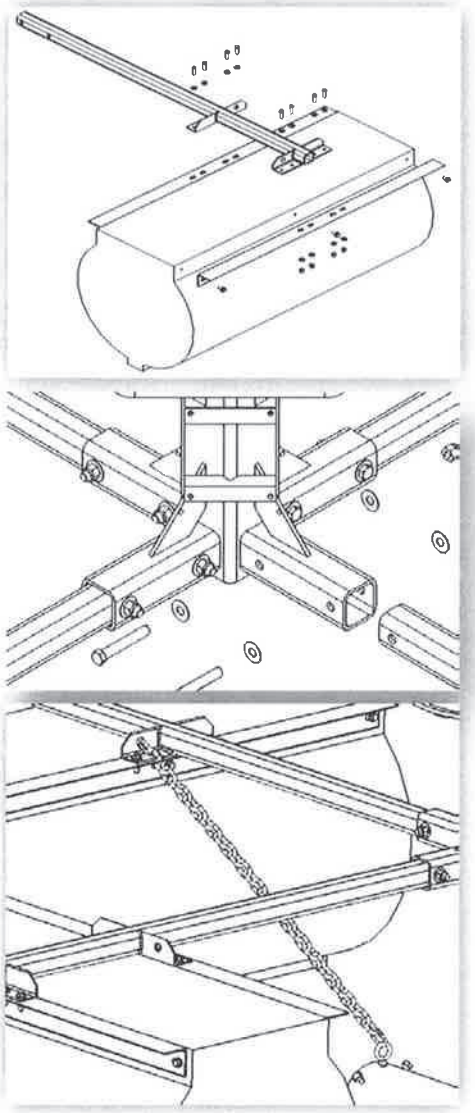


420F Mounting Arm Assembly (4x)



420F Fastener Kit

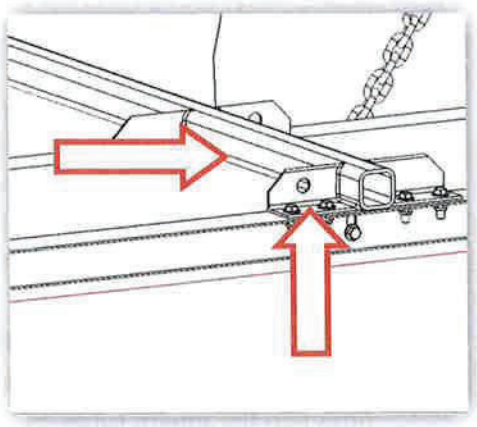
Hoses, power cords, control panels and other accessories will also be packaged with the equipment. These components vary depending on equipment type.
SMI Evaporative Solutions offers several machine control options.



To assemble the 420F Series Evaporator, begin by gathering the components and locating the Pontoons on a level surface. Refer to the Parts List drawings for appropriate part numbers and fasteners.

- Locate 4x Pontoons, 4x Mounting Arms, and fasteners. Place the Mounting Arm on the Pontoon aligning the holes in the arm over the slots in the Pontoon brackets. Attach the Arm to the Pontoon. Repeat for all pontoons and arms. Torque to 25ft lbs.
- Lift the 420F Head Assembly by the lifting eyes attached to the Head Cover. Insert the Mounting Arms into the Square Tubes on the 420F Head Frame. Align the holes and secure with fasteners. Torque to 30ft lbs.
- Lower the assembly to the ground and remove the lift from the lifting eyes.
- Locate the pump and hang the pump from the Float Arms with the chain, attaching the oval-shackle to hang from the hole in the float arm.
- The assembly can now be wired.
- Open junction box covers – junction box is located just above where the Float Arms attach to the Head Mounting Bracket.
- The junction box is equipped with (6) cord and conduit grips. The vibration switch and motor leads are pre-wired from the factory. The third cord grip, with strain relief, will hold the main power cord from control panel to machine. Locate the 10/7 & 18/7 multi-conductor cord and route it through the strain relief into the junction box. The next cord grip terminates the pump cord leads (conduit fitting) and the pump power cord from control panel to junction box (strain relief). Feed the pump leads through the conduit fitting and secure the conduit into the water-tight conduit fitting. Feed the pump power cord through the strain relief fitting and secure the cord with the fitting.
- Terminate the cords according to the electrical schematics provided with the machine.

- Once the cords are terminated, connect the hose to the spray manifold and pump. Some units are equipped with a ball valve for manual control water flow to the spray manifold, some are not (automated control of pump through Variable Frequency Drive).
- Unravel the power cords and stretch them out so they do not tangle. Some units are now provided with optional buoys. If using buoys, assemble them onto the cords spacing approximately 10-15ft apart.
- Attach straps to all four Float Arms or hook through the hole in the end of the Flat Arms. Connect the straps or lifting chains together above the fan and attach to your lifting device.



- If possible, attach the anchoring device to the holes in the float arms. The anchoring system should prevent the evaporator from moving too far on the water surface and prevent the evaportaor floats from rotating.
- Lift the unit from the ground until the pump hangs clear of the ground.
- Carefully place the evaporator in the water making sure the pump is low enough to be below the water level, but not so low that it touches the bottom of the pond.
- Drag the evaporator into position across the surface of the water using the anchoring system.
- Terminate the power cords in the control panel per the electrical schematics.
- Connect the control panel to the power source.
- Turn the control panel disconnect on.

## REQUIREMENTS

| | |
|---|---|
| Electrical: | 460 Volt, 60 Hertz, 3 Phase 60 Amp Service<br>415 Volt, 50Hz, 3 Phase, 63Amp Service<br>(other electrical voltages and cycles available upon request) |
| Water: | Up to 45 gpm @ 100 psi, 20 psi minimum |

## PRE-START CHECK LIST

Once the machine is in position, assembled, and wired, it is important to perform a final inspection prior to putting the evaporator into service. With the electrical power locked and tagged out:

1. Check the fan to verify it can rotate freely and is free of mineral deposits or ice.
2. Verify that the water hose is securely attached to the pump and to the spray manifold.
3. Verify that hoses and cords are out of the path of traffic areas.
4. Verify the wind direction and adjust the head to the appropriate angle for the wind conditions (Boom Series only).
5. Remove the tag and lock and power on the electrical station and control panel.
6. From a safe distance, briefly turn the fan motor on to verify fan direction. The fan should rotate counter clockwise when viewed from motor end of fan blade, or clockwise when looking into the fan blade.
7. With fan off, start pump and verify that water is flowing from the spray manifold. Check the amp draw of the pump to verify that it is spinning in the proper direction. Amp draw should be:

Once the fan rotation and pump function have been verified, the unit is ready to operate. Always maintain a safe distance when the equipment is operating.

## START-UP PROCEDURES

The start-up procedures differ between a manually controlled or automated 420 Evaporator. Automated equipment should always be considered active. Weather and programming conditions are placed on the equipment. If those conditions are met, the evaporators could start without warning. It is important to always be aware of this fact and remove all equipment from energy sources when servicing or inspecting them. Always maintain a safe distance from the equipment when operating the equipment.

### MANUAL START-UP

Manual start-up relies heavily on careful observation by the operator. Visual inspection of the fan for residue or ice is suggested prior to start-up. Once verified, start the fan motor. Observe the fan to make sure that the fan is spinning properly and does not appear to be projecting solids or appear out of balance.

Add water. Depending on the equipment type, this could be as simple as pushing start on the control panel to operate the pump, or it could involve opening a hydrant or valve to supply water from a central pumping station. Regardless of the method, it is important to observe how much water is being supplied, what direction the wind is taking the evaporative mist cloud, and how much fallout is generated. The goal is to adjust the water flow as fine as possible to achieve 100% evaporation of the water with minimum drift and no water fallout back to the water source.

The flow can be regulated via VFD (if equipped), ball valve (if equipped), or through the main hydrant or valve associated with central pumping.

## AUTOMATED START-UP

Automated equipment can start at any time if the programming conditions are met. The program will start the fan and pump and can regulate the flow using a VFD if equipped. SMI Evaporative Solutions offers several controls packages that efficiently and safely operate the equipment. Equipment automated with a VFD drive on the pump can regulate flow depending on wind conditions, temperature, and humidity.

## OPERATION

Operation of the 420 Evaporator in above freezing temperatures is a simple matter of starting the motor and turning on the water. The maximum flow rate for any unit should be determined by the amp meter on the control panel. Full load for the 25 HP motor is 28 amps. This should not be exceeded. Amperage will increase with flow rate.

When operating in freezing temperatures, the 420 Evaporator will probably make some snow. This is actually testimony to the fact that evaporation is still taking place. The powerful cooling effect of evaporation is snap freezing small droplets of water which become the seeds that snow particles build on.

Operating in freezing temperatures will require greater operator input. Precautions against freezing water lines should be taken. Water and power lines should be clearly marked so they will not be damaged if snow clearing operations have to be performed.

During temperatures below freezing, flow rates to each 420 Evaporator should be maximized to prevent ice build up on the fan blades. Ice buildup will cause vibration and possible damage.

Visual inspections should be increased to at least 6 times daily during below freezing temperatures with PREFERENCE TO HOURLY INSPECTIONS.

The operator should make sure that the spray holes are free of any blockage as the resultant reduction of flow will cause ice buildup.

## SHUT-DOWN PROCEDURES

Trouble-free start-up of your 420 Evaporator relies upon proper shutdown procedure. In extreme cold conditions, it is essential these procedures be performed as quickly as safety permits.

1. If temperatures are below freezing, turn off the fan motor. Shut off the water at the hydrant (420B Series). Go to Step #3.
2. If temperatures are above freezing, turn off water at the hydrant (420B Series). Shut off the fan. Go to Step #3.
3. Disconnect the hose and drain it to the side, if possible.

The water feed hose and pump on a 420F Series is self draining for cold weather operation.

# MAINTENANCE

## DAILY MAINTENANCE

Conduct visual inspection from a distance so as not to get wet. Check for vibration, scale build-up or decrease in water flow. Vibration is usually caused by build-up of scale or ice on the blade which has to be cleaned off. Low flow is usually caused by large particles blocking the spray holes. If this is the case, clean out by back flushing with water after unhooking the water intake from the manifold.

### 420B SERIES MAINTENANCE

If a problem is observed, disconnect power and water, remove the boom pin from the locking bar and lower the gun. Once the unit is lowered, be certain to attach the maintenance position safety chain between the boom arm and frame unit prior to performing any work on the machine. Also, block the concrete counter weight up if the head of the gun has to be removed for any reason.

### 420F SERIES MAINTENANCE

If a problem is observed, disconnect power, remove the pump from the water. Once the unit is prepared, bring the unit ashore for maintenance.

## WEEKLY MAINTENANCE

Disconnect power and water and inspect and clean fan, spray ring, and fasteners.

## ANNUAL MAINTENANCE

De-scale motor cooling fins if necessary.

# TROUBLE SHOOTING

## Ice-Covered Machine

Ice build up on a 420F can cause the unit to become unstable and sink or tip over. SMI recommends that during cold temperatures, when ice can be formed, that the 420F not be used until temperatures warm.

Ice can also build up on a 420B Series Evaporator running at cold temperatures and low flow. If ice has built up on the fan, lower the boom to 45° or less, increase the water flow to "wash" off the ice build-up. If the ice will not "wash" off, try turning the fan off, and continue to flow the water over the fan. If this does not remove the ice, consider shutting the evaporator down until temperatures warm.

Contact SMI for suggestions on operating in freezing temperatures.

## Fan Rotation

If the fan rotates in reverse, the fan motor phasing is incorrect. If each station is checked before the season start-up, this problem should be eliminated. Phasing can be changed by switching any two of the power supply lines at the top of the main disconnect in the control panel. CAUTION: Do not change any wires or open a control box or electric station with the electric supply turned on. Disconnect power supply to be safe.

## 420B SERIES WARNINGS

**Evaporator Operating Locking Bar Must be in Position When Operating!**

**Before Lowering Evaporator, Power Must Be Turned Off and Locked Out by Person Working on Unit!**

**Evaporator Maintenance Position Safety Chain Should be Attached to Boom Arm and Base Frame Before Performing Any Maintenance!**

**Before Removing Motor And/Or Fan Assembly From Boom, Counter Weight Should Be Securely Blocked Up To Prevent Over Loading Jack Or Creating Unbalanced Situation!**

**It is the responsibility of the operator to ensure that any fallout from the 420B Evaporator is within the catchment area and that all designated Federal and State environmental regulations are adhered to.**

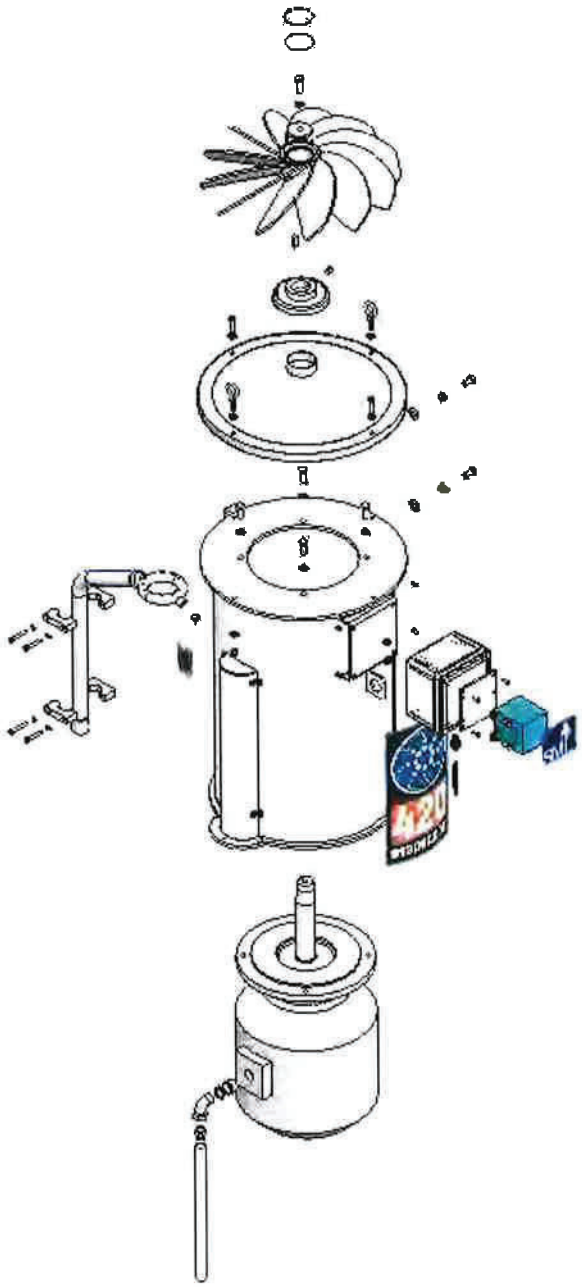
## 420F SERIES WARNINGS

**Before Maintaining Evaporator, Power Must Be Turned Off and Locked Out by Person Working on Unit!**

**It is the responsibility of the operator to ensure that any fallout from the 420F Evaporator is within the catchment area and that all designated Federal and State environmental regulations are adhered to.**

**Operating the 420F in below freezing temperatures can result in ice covering the machine. Ice build-up can cause instability and possibly sinking of the unit.**

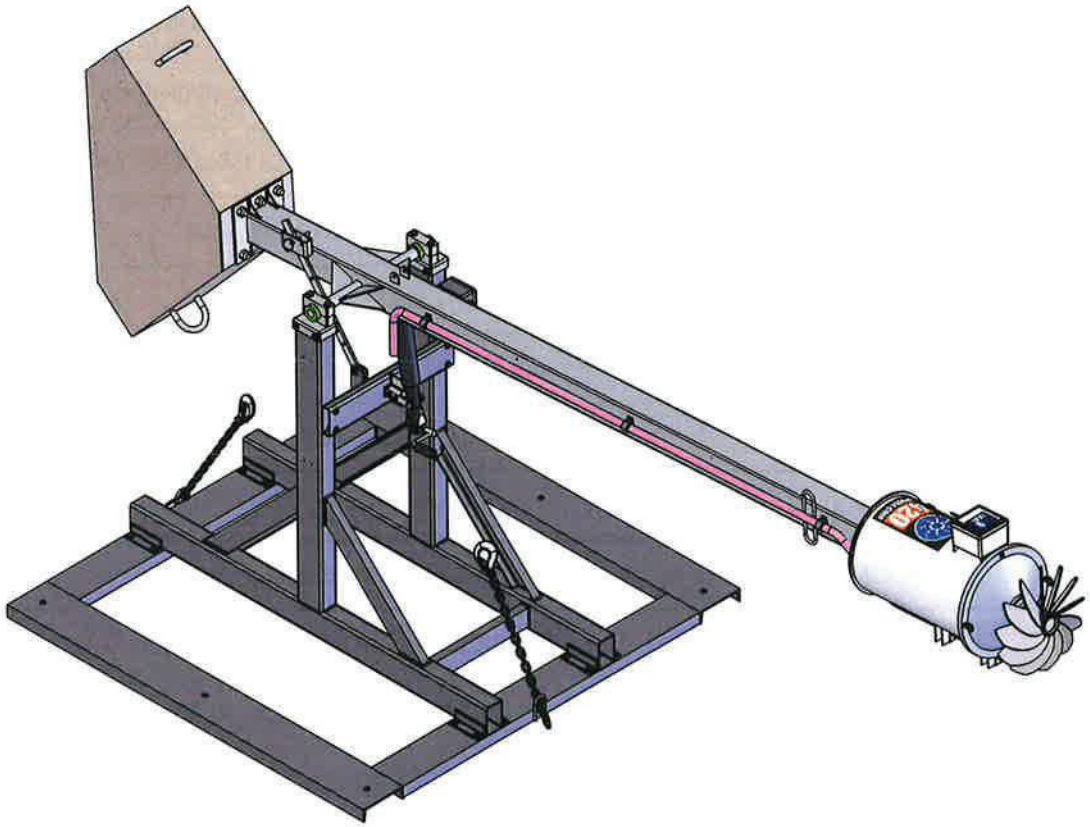
# PARTS LIST



# 420 EVAP 460V/60HZ, 2HP BOOM ASM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 420 Boom Frame | | 420F BOOM FRAME ASM | |
| 2 | 1 | 420-EVAP-JACK | | 420 EVAPORATOR LINEX JACK COMPONENTS | |
| 3 | 1 | 420-EVAP-BOOM | | 420 EVAPORATOR BOOM COMPONENTS | |
| 4 | 1 | 340304-6 | | 180 DEG EVAPORATOR BOOM LOCK BAR | |
| 5 | 1 | 340304-2 | | EVAP LOCK BAR PIN ASSY | |
| 6 | 2 | .50 Nom ID | | SS FLAT WASHER | |
| 7 | 1 | 1/2-13 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 8 | 1 | 1/2-13 x 2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 9 | 1 | 420-EVAP-HEAD | | 420 EVAPORATOR HEAD ASM | |
| 10 | 1 | 27-420-BOOM | | 420 BOOM J-BOX ASM | |
| 11 | 2 | 33-003000 | | 5/16 CLEVIS SLIP HOOK WITH LATCH | |
| 12 | 1 | 33-003001 | | 5/16 ZINC COATED CHAIN (FT) | |
| 13 | 2 | 33-003004 | | 180 DEG COUNTER WEIGHT SAFETY CHAIN ASM | |
| 14 | 3 | 23-001100 | | 1-3/8" OD SS CUSHION HOSE CLAMP | |
| 15 | 2 | 23-001101 | | 3/4" SS CUSHION HOSE CLAMP | |
| 16 | 4 | 23-001099 | | 1-1/8" SS CLAMP 6/4 SOW CORD | |
| 17 | 1 | 31-002257 | | 1" x 180" SINGLE WIRE HOSE ASM | |

WEIGHT: LB



# 420B SERIES EVAPORATOR, 180 DEG GALV FRAME ASM

WEIGHT: 3895.57 LB

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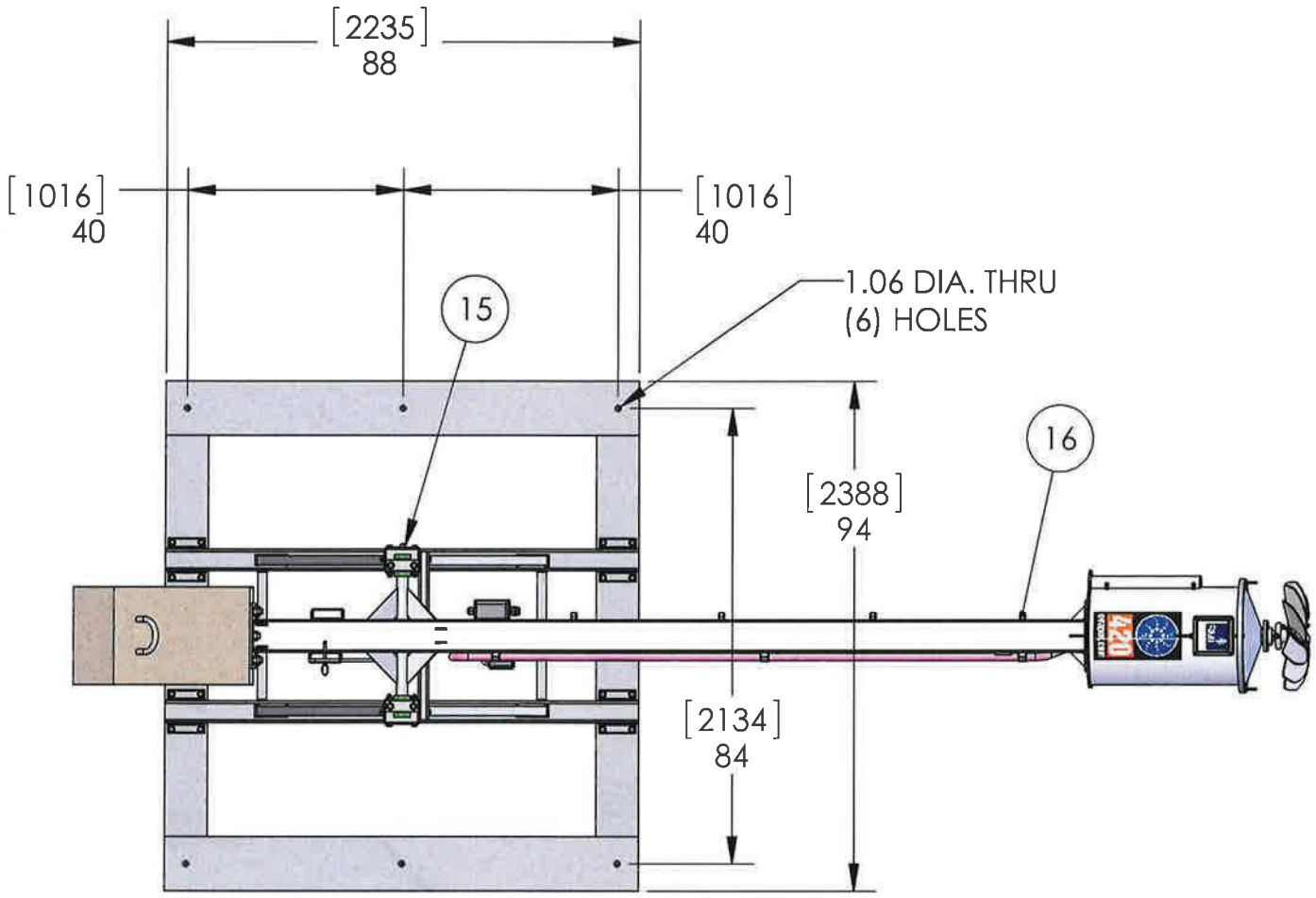
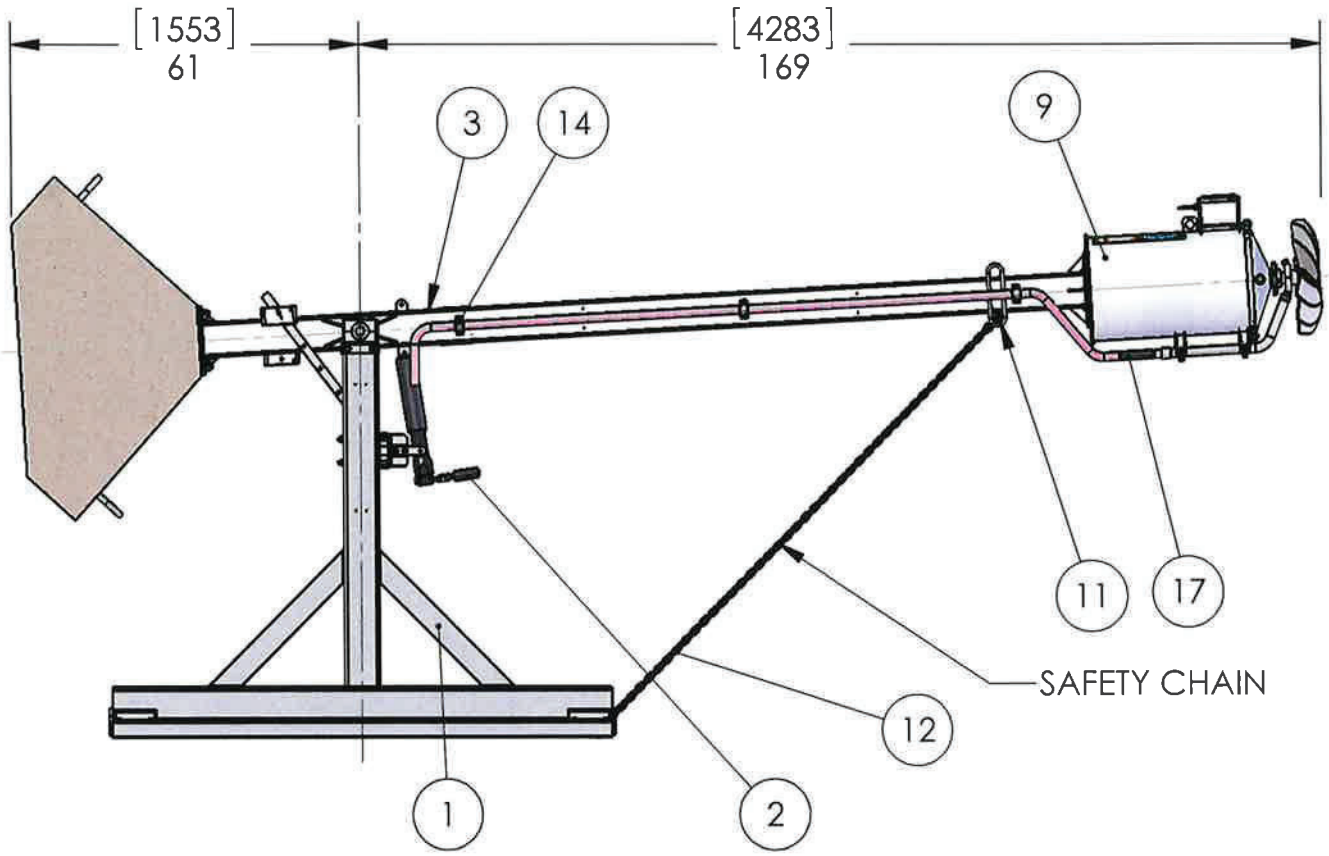



# 420B SERIES EVAPORATOR, 180 DEG GALV FRAME ASM

WEIGHT: 3895.57 LB

SMI Evaporative Solutions
EVAPOR.COM




# 420B SERIES EVAPORATOR, 180 DEG GALV FRAME ASM

WEIGHT: 3895.57 LB

SMI Evaporative Solutions
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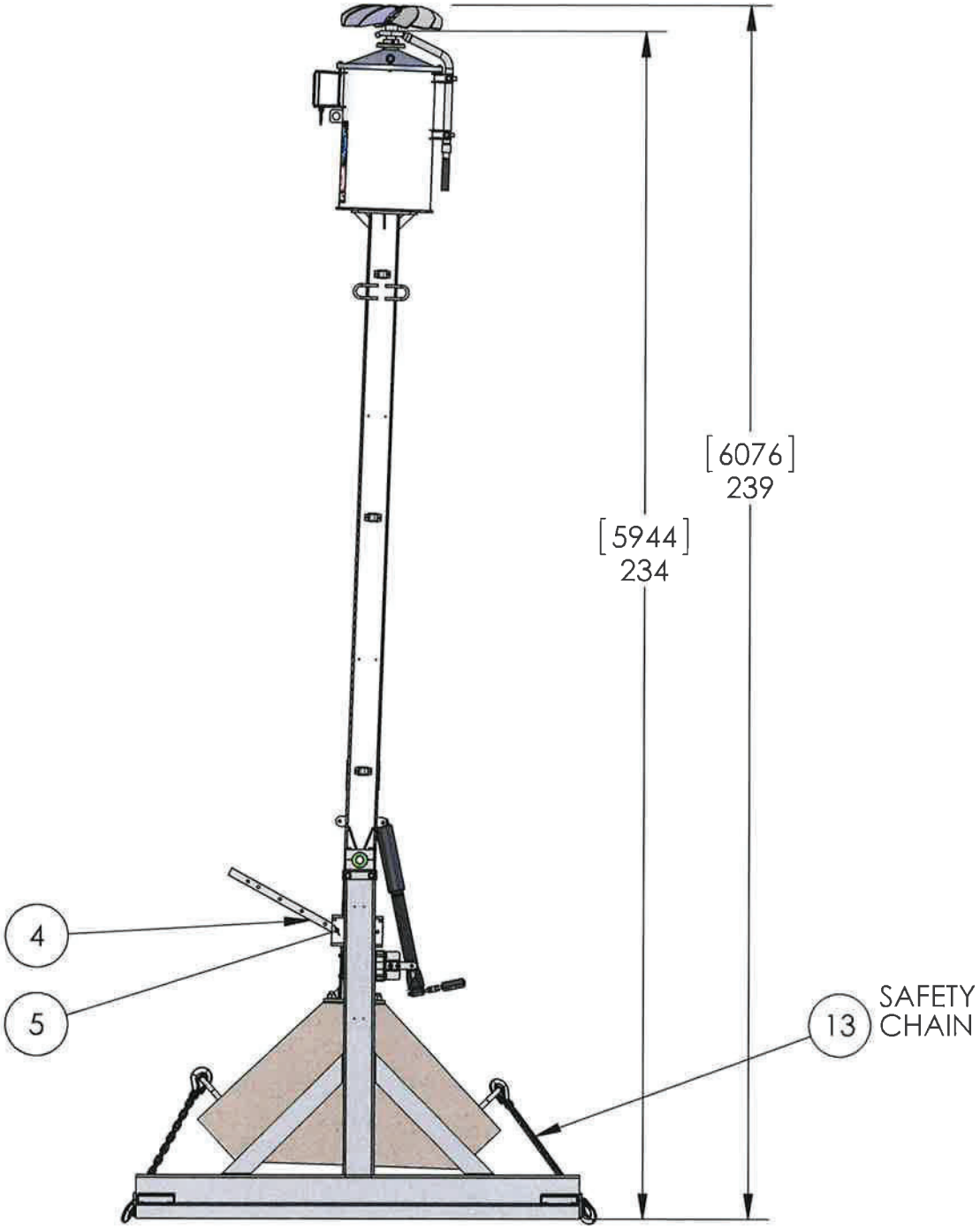


# 420B SERIES EVAPORATOR, 180 DEG GALV FRAME ASM

WEIGHT: 3895.57 LB

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# 420F BOOM FRAME ASM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 340500-3 | | 180 DEG. EVAP PLATFORM | |
| | | 340500-3-COAT | | COATED EVAP PLATFORM | |
| 2 | 1 | 340400-6 | | 180 DEG EVAPORATOR SUPPORT FRAME | |
| | | 340400-6-COAT | | COATED 180 DEG EVAPORATOR SUPPORT FRAME | |
| 3 | 2 | 340401-2 | | 2002 EVAPORATOR UPPER PIVOT BLOCK | |
| 4 | 2 | 340402-2 | | LOWER PIVOT BLOCK ASSEMBLY | |
| 5 | 2 | 340403-1 | | NYLON PIVOT BUSHING | |
| 6 | 1 | 340400-5 | | 180 DEGREE EVAPORATOR JACK BRACKET ASSY | |
| | | 340400-5-COAT | | COATED 180 DEG EVAPORATOR JACK BRACKET ASSY | |
| 7 | 1 | 340400-4 | | JACK BRACKET TAB | |
| 8 | 4 | .38 Nom ID | | SS FLAT WASHER | |
| 9 | 52 | .50 Nom ID | | SS FLAT WASHER | |
| 10 | 2 | 3/8-16 x 4" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 11 | 2 | 3/8-16 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 12 | 24 | 1/2-13 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 13 | 16 | 1/2-13 x 1-3/4" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 14 | 4 | 1/2-13 x 5-1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 15 | 4 | 1/2-13 x 3-3/4" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 16 | 4 | 1/2-13 x 9" LG | | STAINLESS STEEL HEX HEAD SCREW | |

WEIGHT: LB

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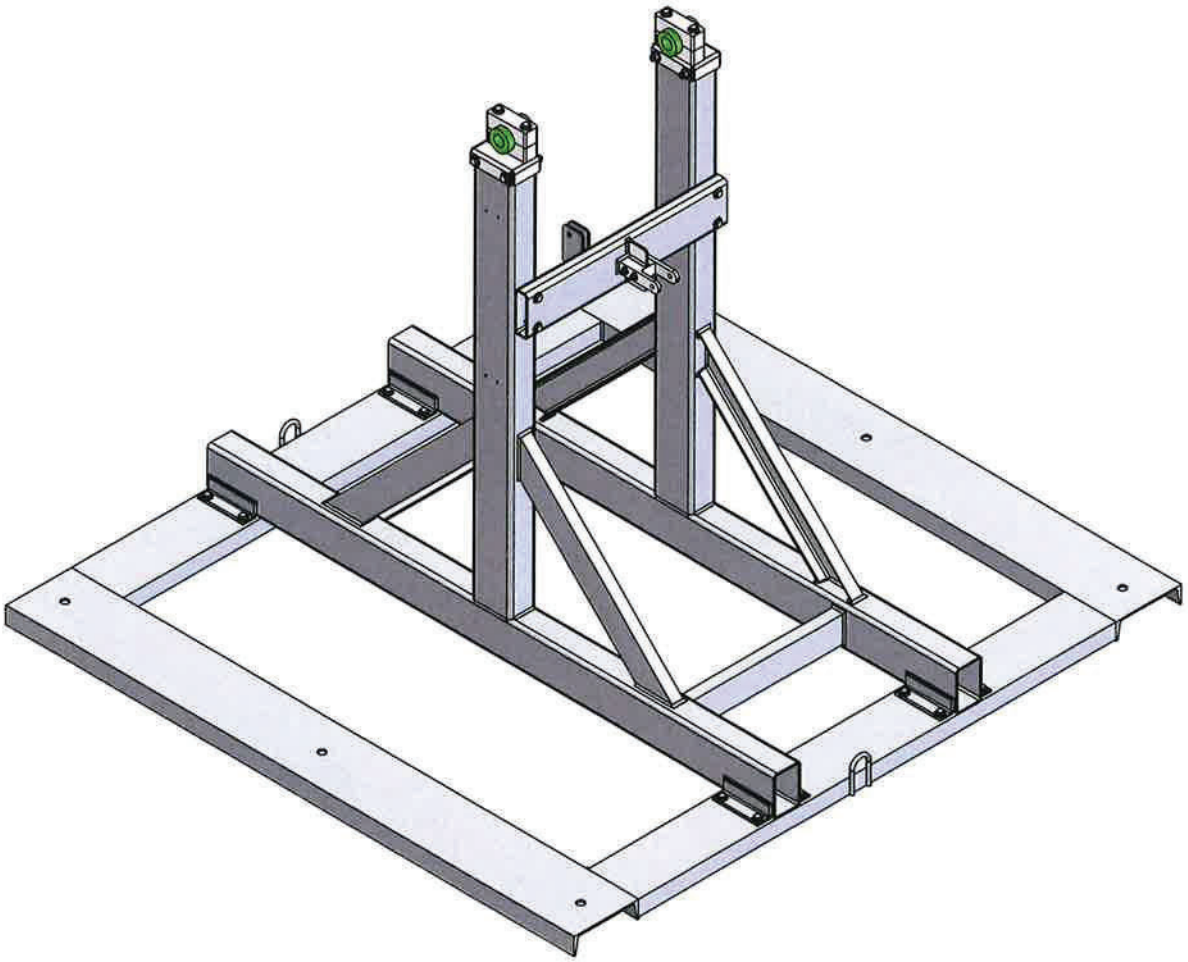

# 420F BOOM FRAME ASM

WEIGHT: 963.82 LB ( KG)

Evaporative Solutions
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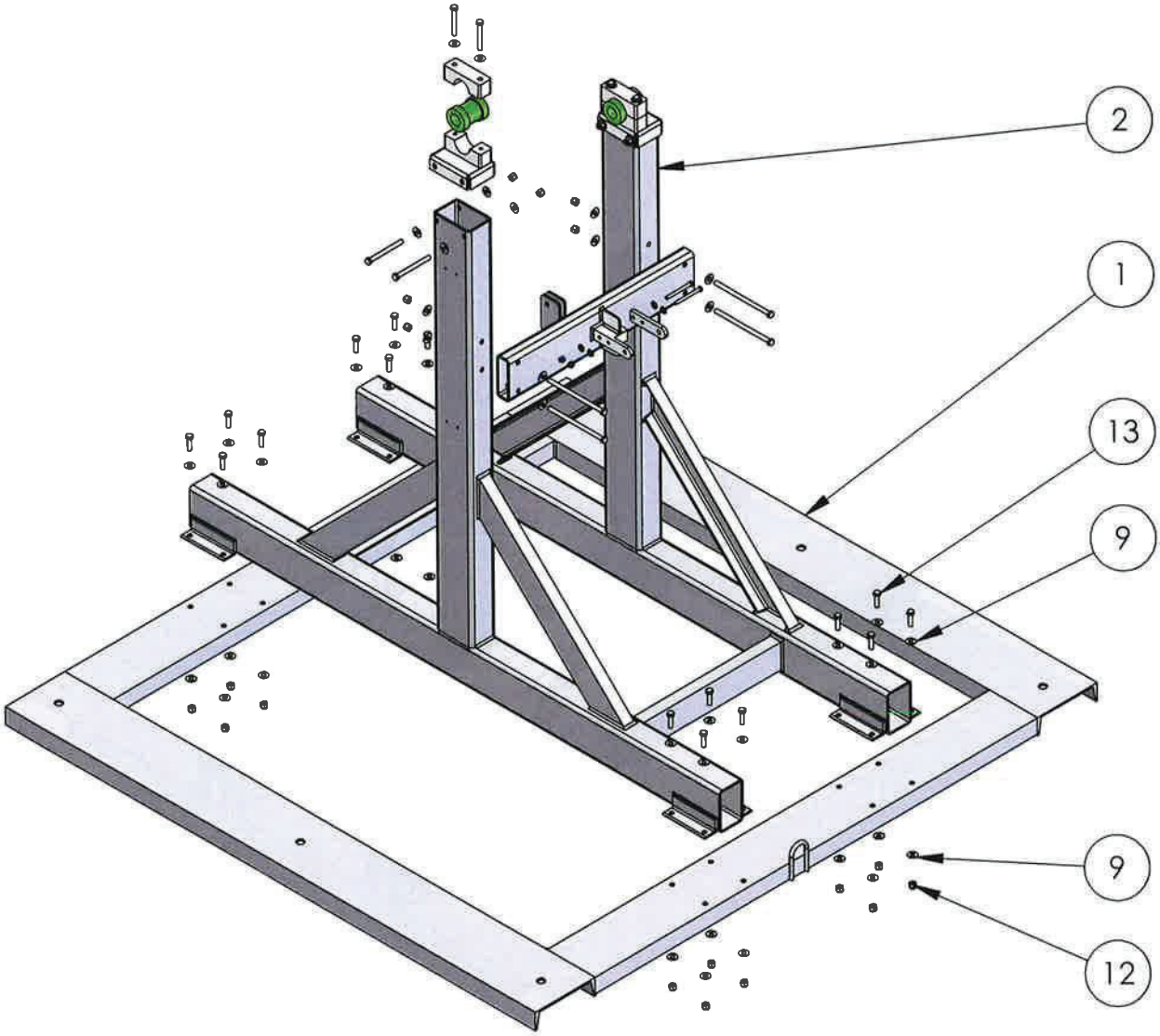


# 420F BOOM FRAME ASM

WEIGHT: 963.82 LB ( KG)

SMI Evaporative Solutions
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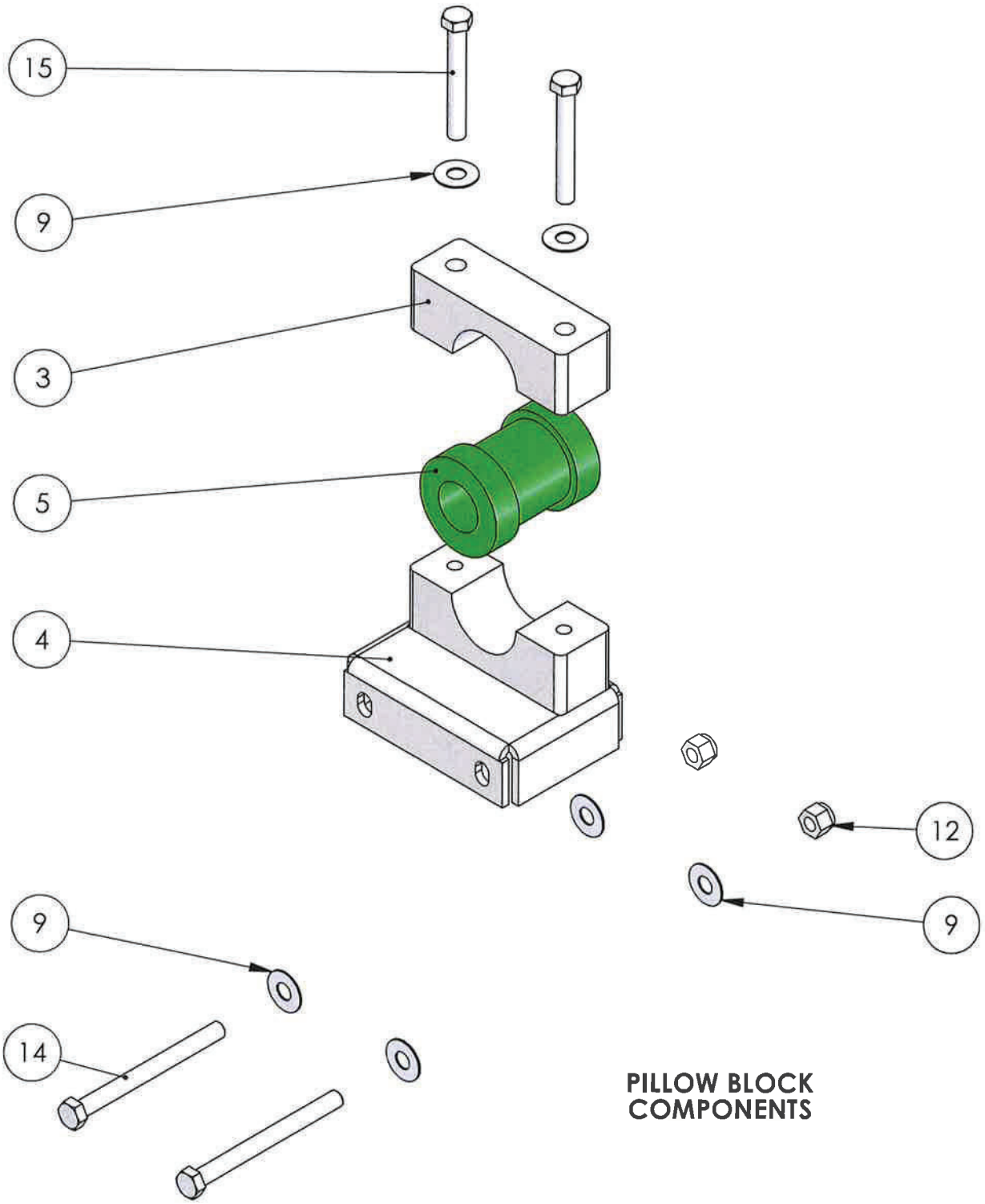


**PILLOW BLOCK COMPONENTS**

# 420F BOOM FRAME ASM

WEIGHT: 963.82 LB ( KG)

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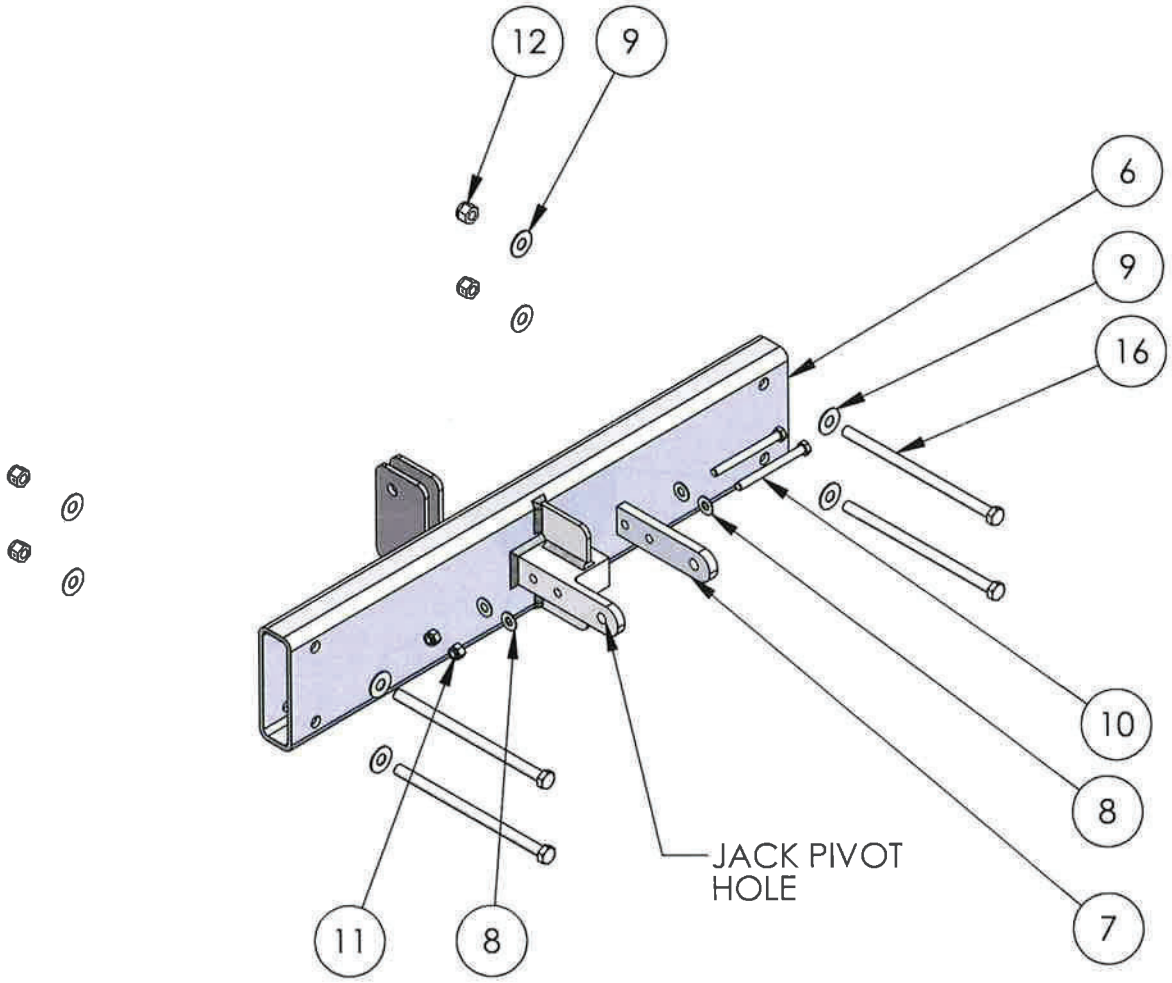


**JACK BRACKET COMPONENTS**

# 420F BOOM FRAME ASM

WEIGHT: 963.82 LB ( KG)



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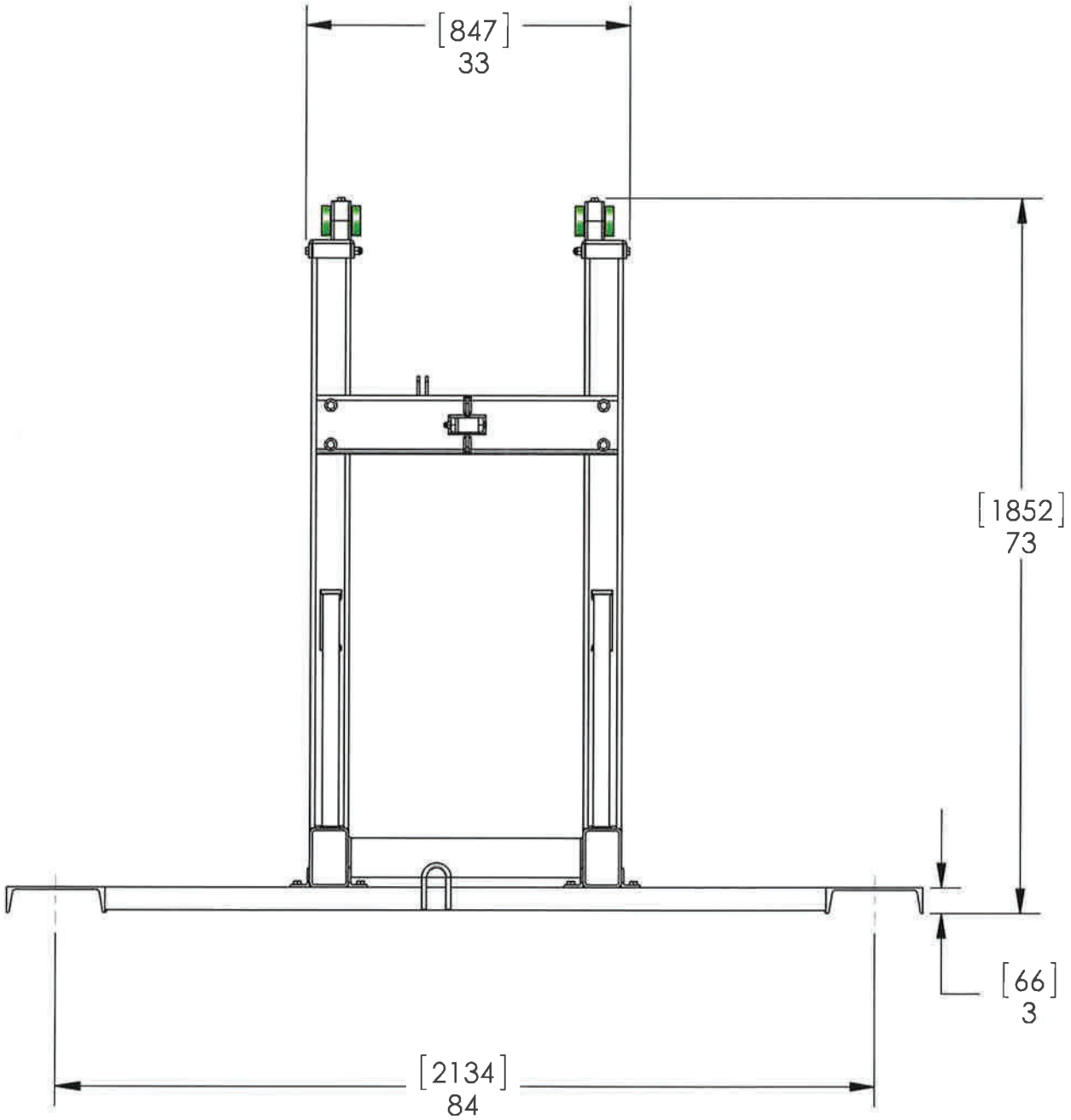
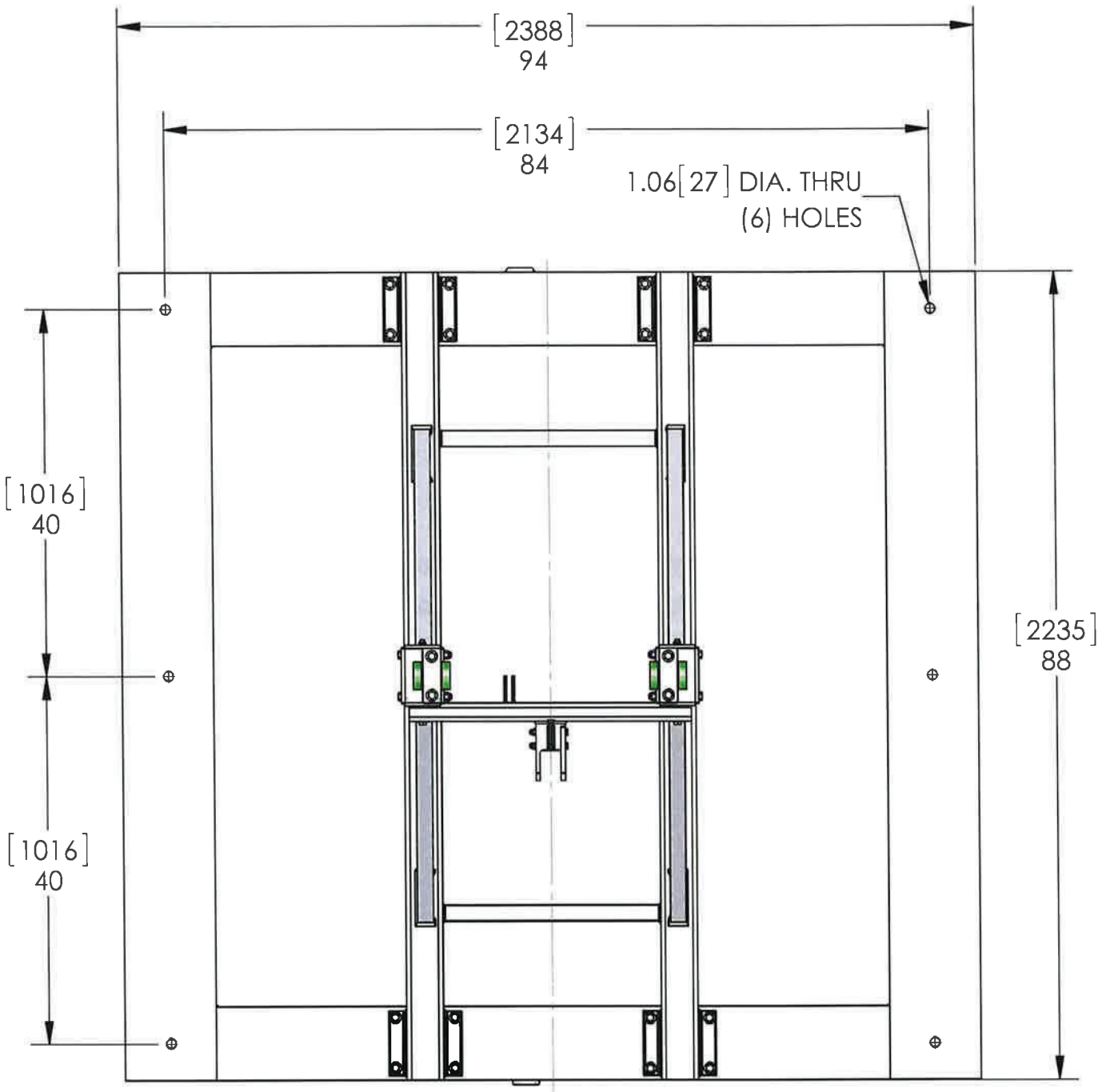



# 420F BOOM FRAME ASM

WEIGHT: 963.82 LB ( KG)

SMI Evaporative Solutions
EVAPOR.COM




# 420F BOOM FRAME ASM

WEIGHT: 963.82 LB ( KG)



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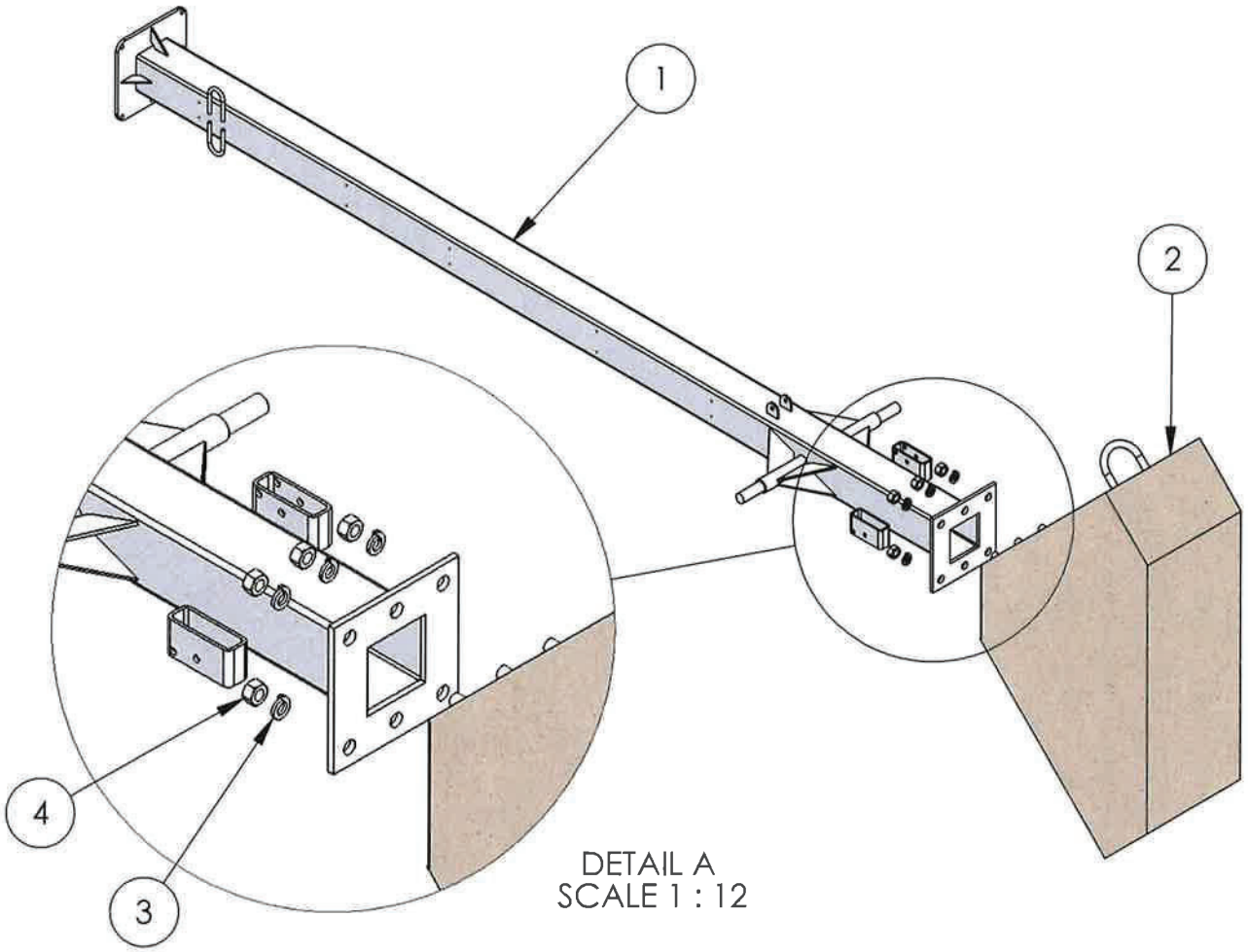
# 420 EVAPORATOR BOOM COMPONENTS

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 420300-2 | | GALVANIZED 180 DEG EVAP BOOM | |
| | | 420300-2SS | | 420 SS 180 DEG EVAP BOOM | |
| 2 | 1 | 340305-6 | | 180 DEG COUNTER WEIGHT | |
| 3 | 6 | 1.0 LOCK WASHER | | 1" SS LOCKWASHER | |
| 4 | 6 | 1-8 THD | | STAINLESS STEEL HEX NUT | |




DETAIL A
SCALE 1 : 12

WEIGHT: 2265.95 LB

# 420 EVAPORATOR BOOM COMPONENTS

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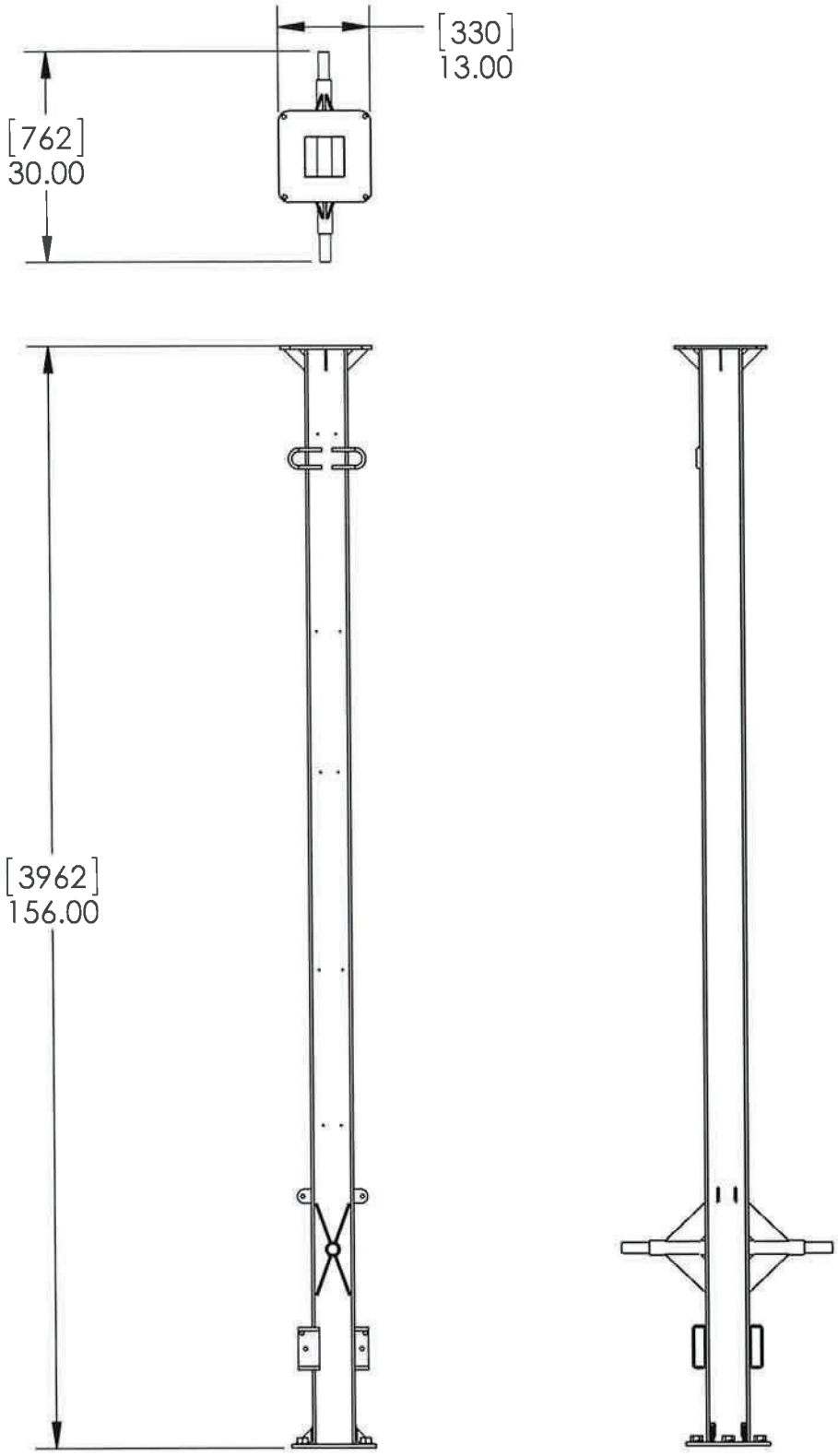


# 420 EVAPORATOR BOOM COMPONENTS

WEIGHT: 2265.95 LB

SMI Evaporative Solutions
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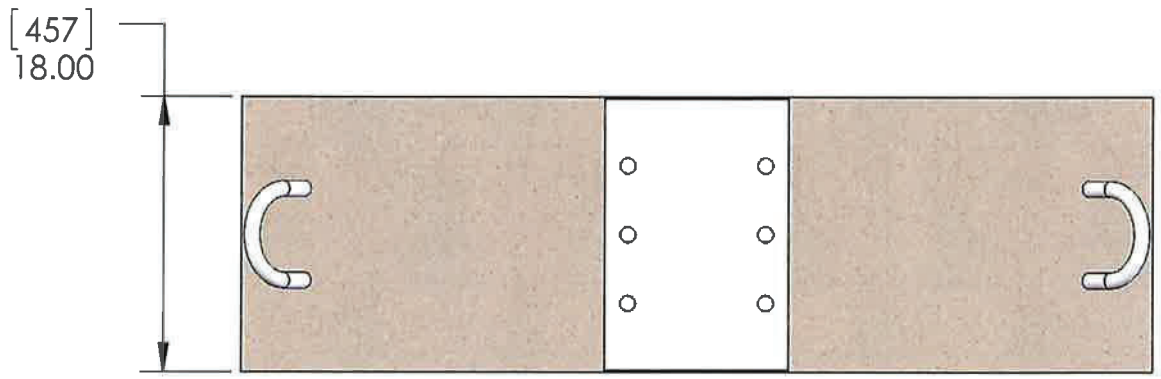


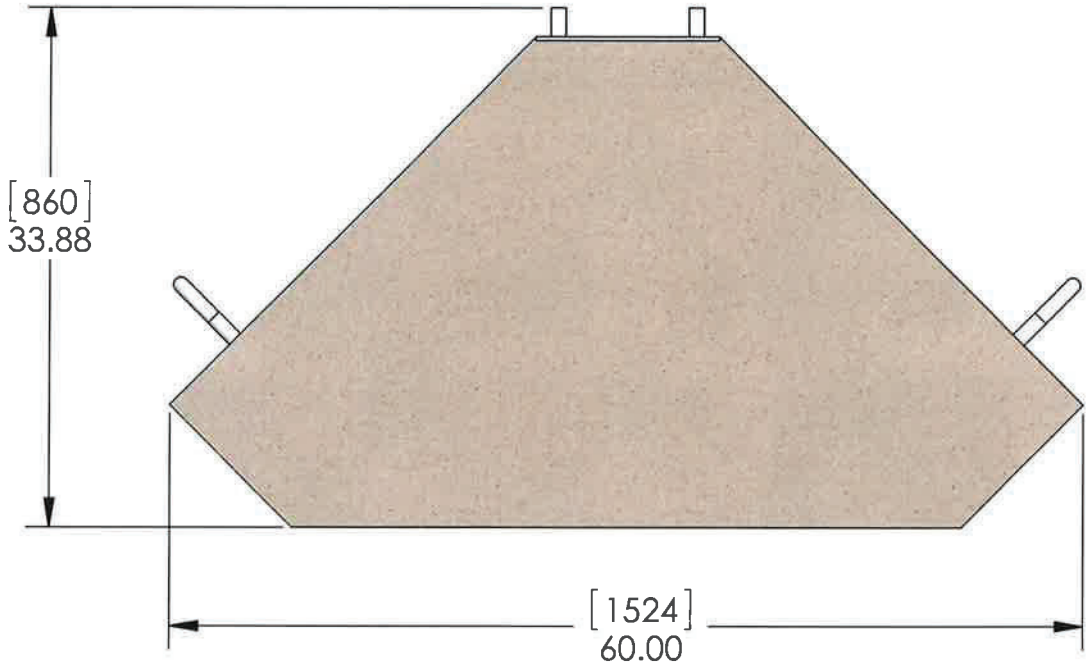


# 420 EVAPORATOR BOOM COMPONENTS

WEIGHT: 2265.95 LB

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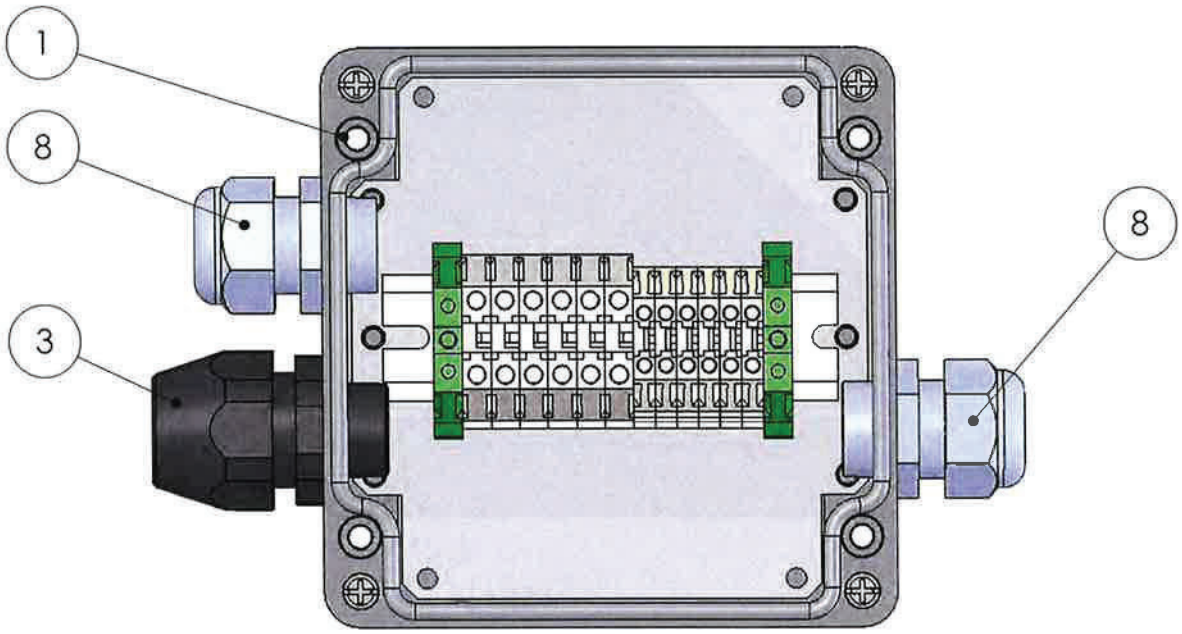
DOCUMENT NO.: 27-420-BOOM REV. LEVEL: REV. DATE:

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 27-000107 | | J-BOX | |
| 2 | 1 | 27-000107BP | | 420 J BOX BACK PLATE | |
| 3 | 1 | 22-007011 | | 3/4 PLASTIC CONDUIT FITTING | |
| 4 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 5 | 2 | 23-003000 | | AB1TP635U 8mm GROUNDING BLOCK | |
| 6 | 6 | 23-003005 | | AB1VV435U 4mm BOX LUG BLOCK | |
| 7 | 6 | 23-003014 | | AB1VV635U 6mm BOX LUG BLOCK | |
| 8 | 2 | SHOP SUPPLIES | | 3/4" SINGLE HOLE CORD GRIP | |




# 420 BOOM J-BOX ASM

WEIGHT: 4.30 LB

SMI Evaporative Solutions
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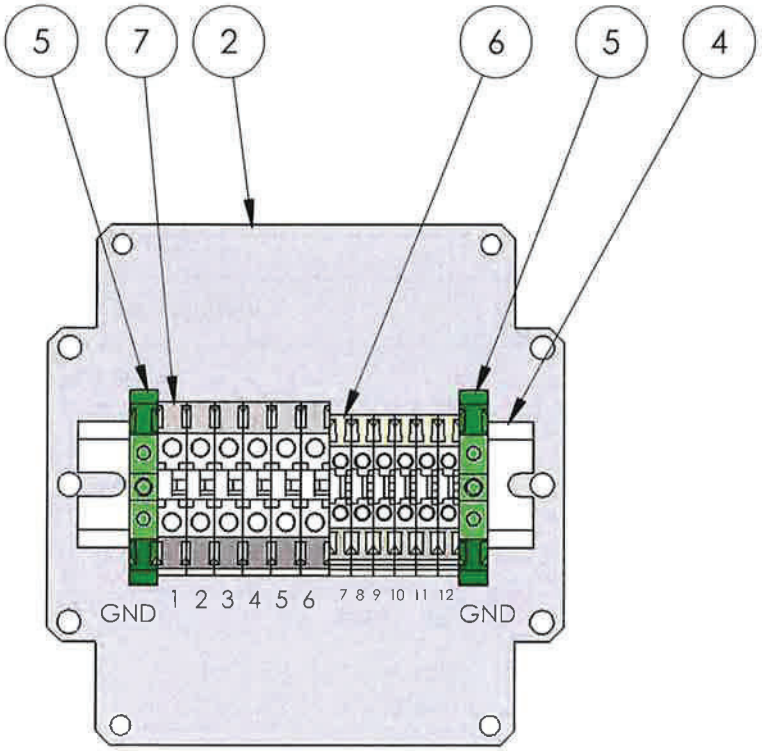
DOCUMENT NO.: 27-420-BOOM REV. LEVEL: REV. DATE:




| 420 BOOM J-BOX WIRING | | | | |
|---|---|---|---|---|
| TERMINAL | WIRE SIZE | COMPONENT | COMPONENT CORD COLOR OR MARKING | MULTI-CONDUCTOR CORD COLOR |
| GND | #10 | MOTOR | GREEN | GREEN |
| 1 | | | T1 | RED |
| 2 | | | T2 | BLACK |
| 3 | | | T3 | WHITE |
| 4 | | | T4 | BLUE |
| 5 | | | T5 | BROWN |
| 6 | | | T6 | ORANGE |
| 7 | #18 | VIBRATION SWITCH | RED | RED |
| 8 | | | RED/BLACK | RED/BLACK |
| 9 | | | BLUE/BLACK | BLUE/BLACK |
| 10 | | | BROWN | BROWN |
| 11 | | | BLUE | BLUE |
| 12 | | | BLACK | BLACK |
| GND | | | YELLOW | YELLOW/BARE |

# 420 BOOM J-BOX ASM

WEIGHT: 4.30 LB

SMI Evaporative Solutions
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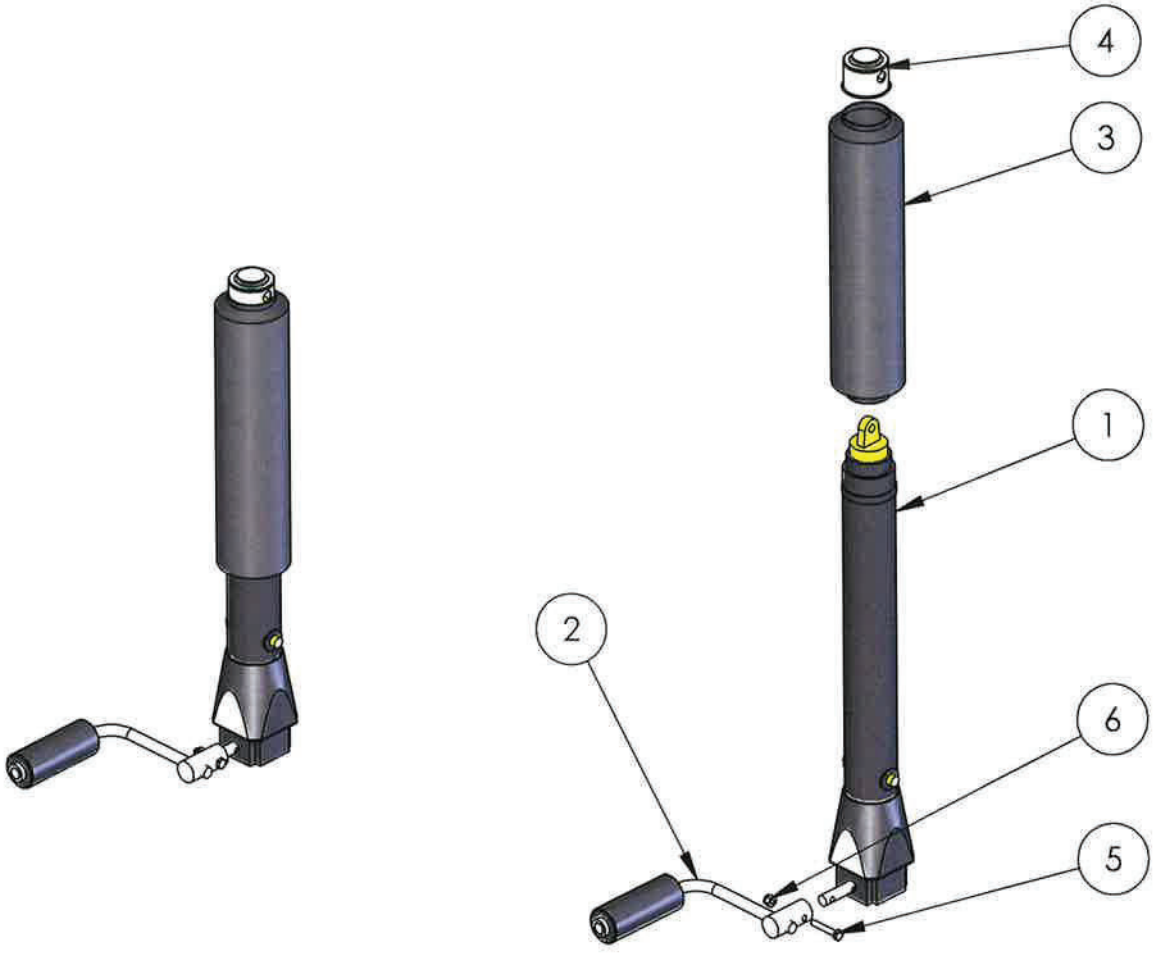
# 420 EVAPORATOR LINEX JACK COMPONENTS

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 340303-1 | | LINEX COATED EVAPORATOR JACK | |
| 2 | 1 | 340302-5 | | EVAP JACK HANDLE | |
| 3 | 1 | 39-840003-JB | | Vertical Adjustment Jack Boot | |
| 4 | 1 | 340302-8 | | JACK BOOT CAP | |
| 5 | 1 | 1/4-20 x 1-1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 6 | 1 | 1/4-20 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |




WEIGHT: 6.01 LB

# 420 EVAPORATOR LINEX JACK COMPONENTS

SMI Evaporative Solutions
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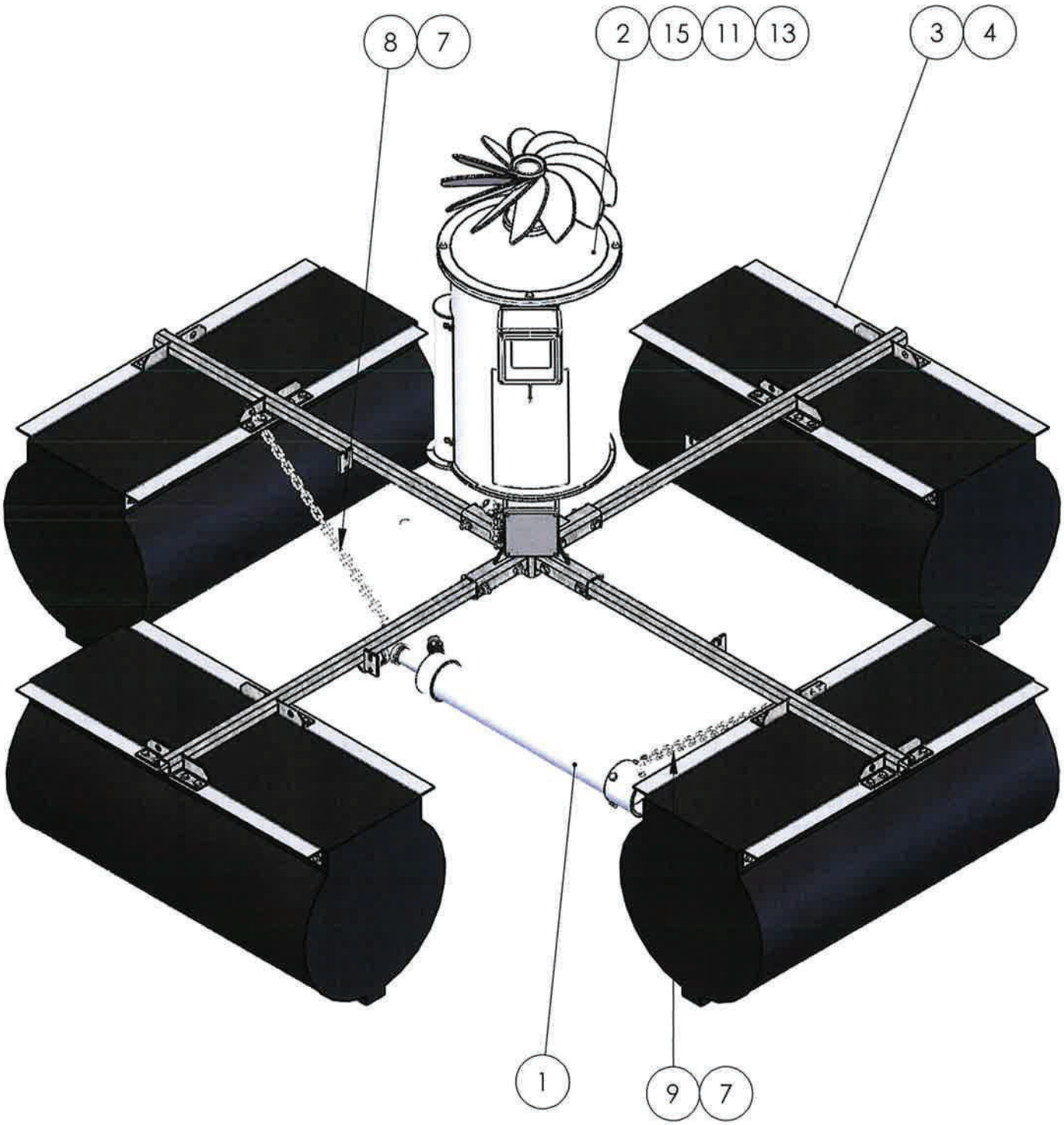
# 420 FLOAT EVAPORATOR ASM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 420 2.0hp_460V_60Hz 4 Inch Sleeve Pump Asm | | 2.0HP, 60 HZ, 7 STAGE SUBMERSIBLE PUMP ASM | |
| 2 | 1 | 420-EVAP-HEAD | | 420 EVAPORATOR HEAD ASM | |
| 3 | 1 | 420 FLOAT FRAME | | 420 FLOAT FRAME COMPONENTS | |
| 4 | 1 | 420F FRAME-SS | | 420 FLOAT FRAME - STAINLESS STEEL (NOT SHOWN) | |
| 5 | 1 | 27-420-FLOAT | | 420F FAN AND VIBRATION SWITCH JUNCTION BOX | |
| 6 | 1 | 27-420-FLOATP | | 420 FLOAT PUMP JUNCTION BOX | |
| 7 | 4 | 10-000045 | | 3/16 OVAL THREADED CONNECTOR | |
| 8 | 1 | 33-003012 | | 3/16" X 29" L S.S. CHAIN | |
| 9 | 1 | 33-003011 | | 3/16" X 32" L S.S. CHAIN | |
| 10 | 8 | .25 Nom ID | | SS FLAT WASHER | |
| 11 | 8 | .50 Nom ID | | SS FLAT WASHER | |
| 12 | 8 | 1/4-20 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 13 | 4 | 1/2-13 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 14 | 8 | 1/4-20 x 1-1/2" LG | | SHCS, STAINLESS STEEL | |
| 15 | 4 | 1/2-13 x 2" LG | | HEX HEAD CAP SCREW, STAINLESS STEEL | |
| 16 | 1 | 63-000034 | | 1" 2-WAY SS BALL VALVE DIRECT MOUNT 2-PIECE | |
| 17 | 1 | 61-001006 | | 1" SS CLOSE NIPPLE | |
| 18 | 1 | 31-002256 | | 1" x 68" 420 FLOAT HOSE ASSY. (NOT SHOWN) | |

WEIGHT: LB




WEIGHT: 1156.03 LB



SMI Evaporative Solutions
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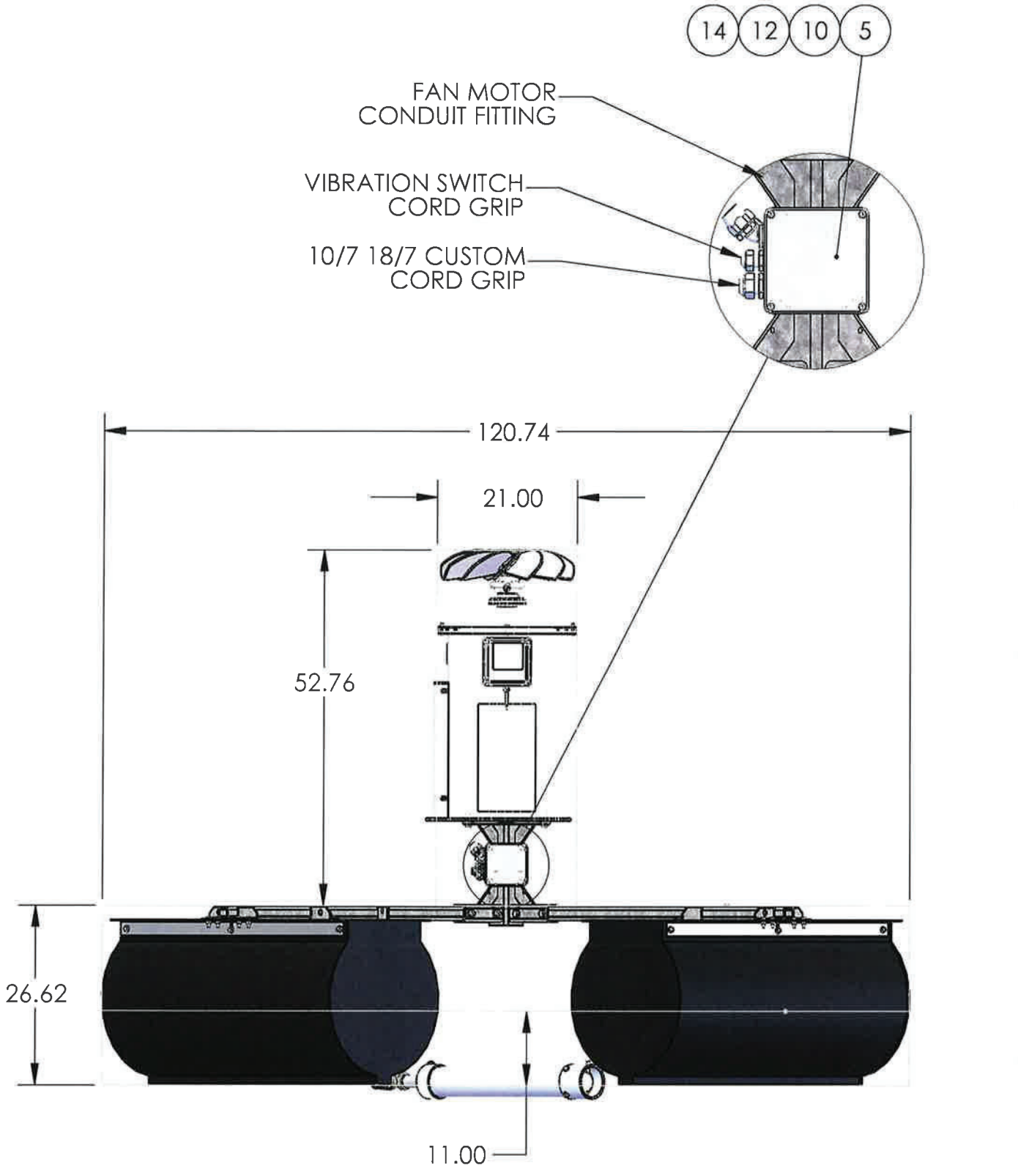


WEIGHT: 1156.03 LB

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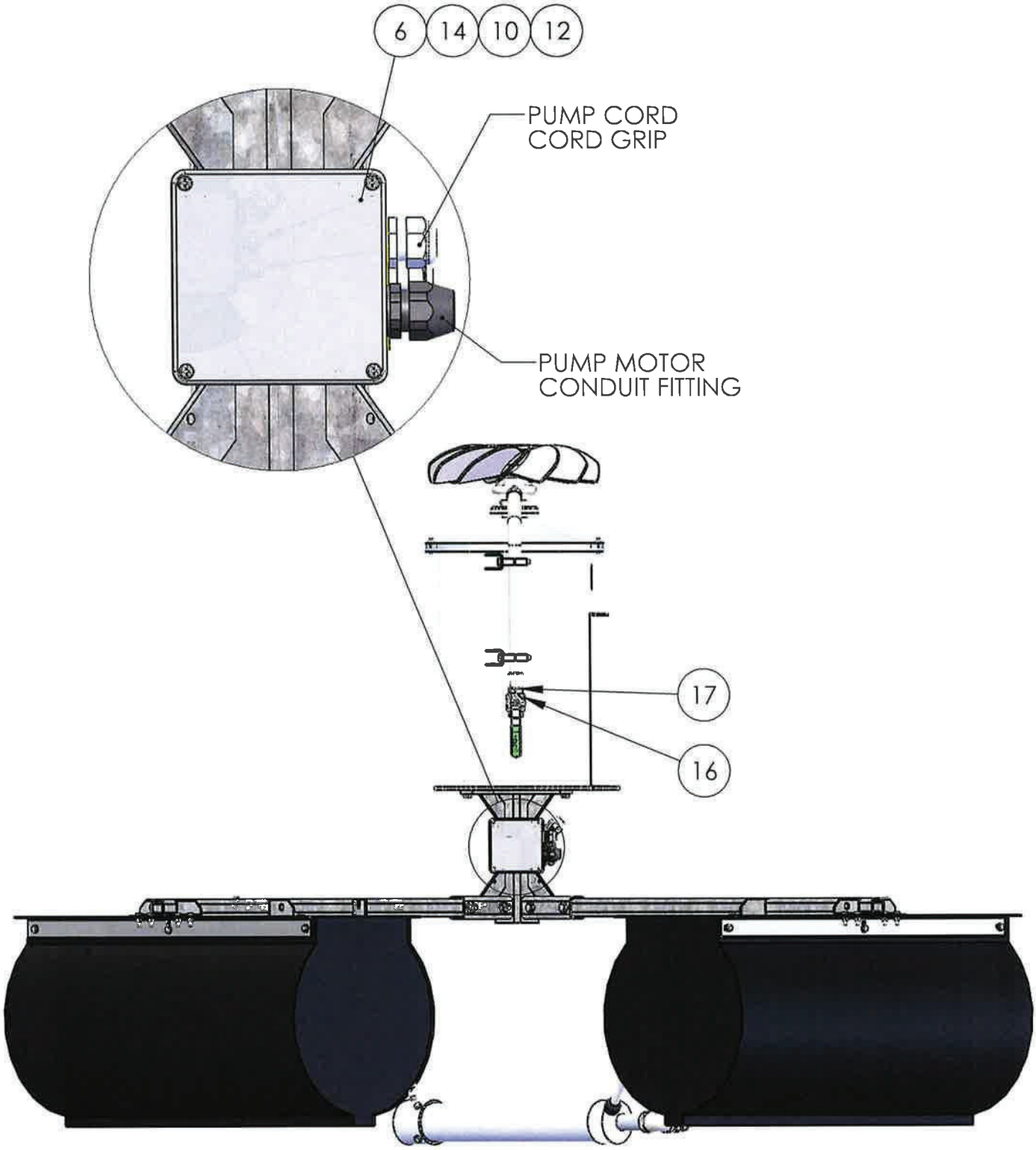


WEIGHT: 1156.03 LB

SMI Evaporative Solutions
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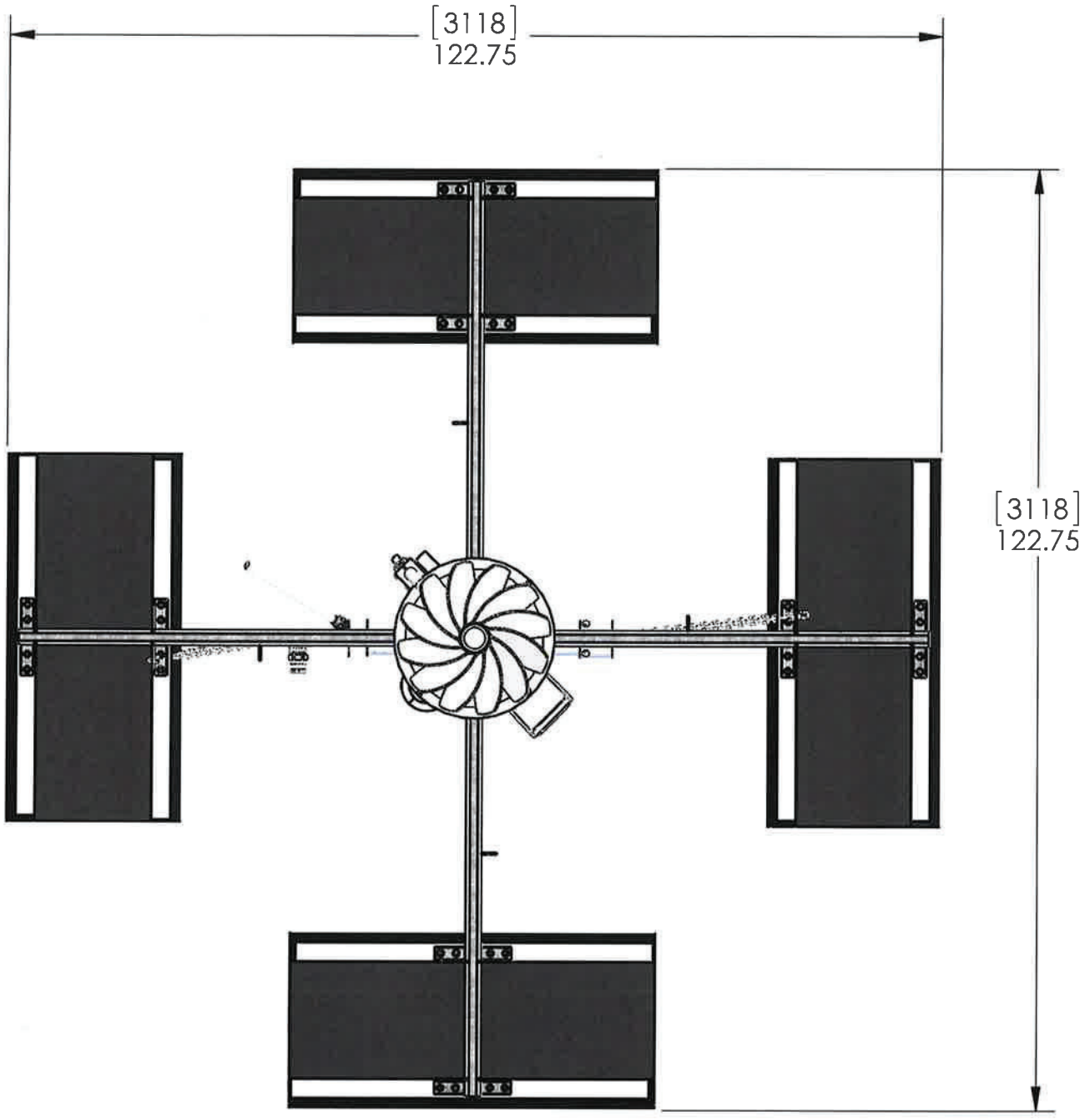


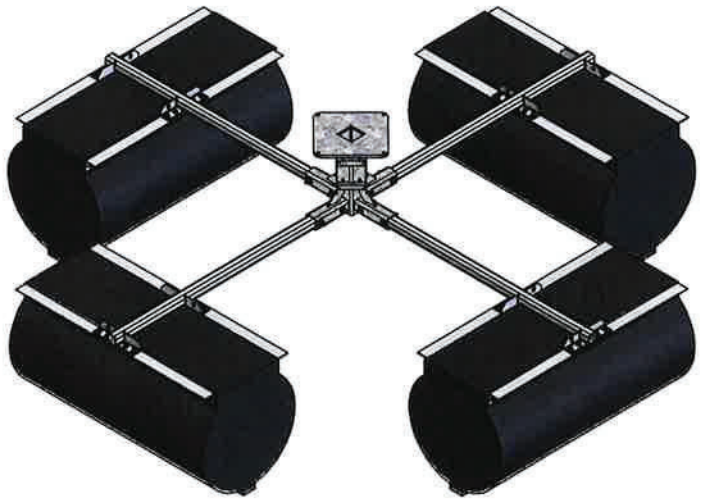

WEIGHT: 1156.03 LB



SMI Evaporative Solutions
EVAPOR.COM

# 420 FLOAT FRAME COMPONENTS

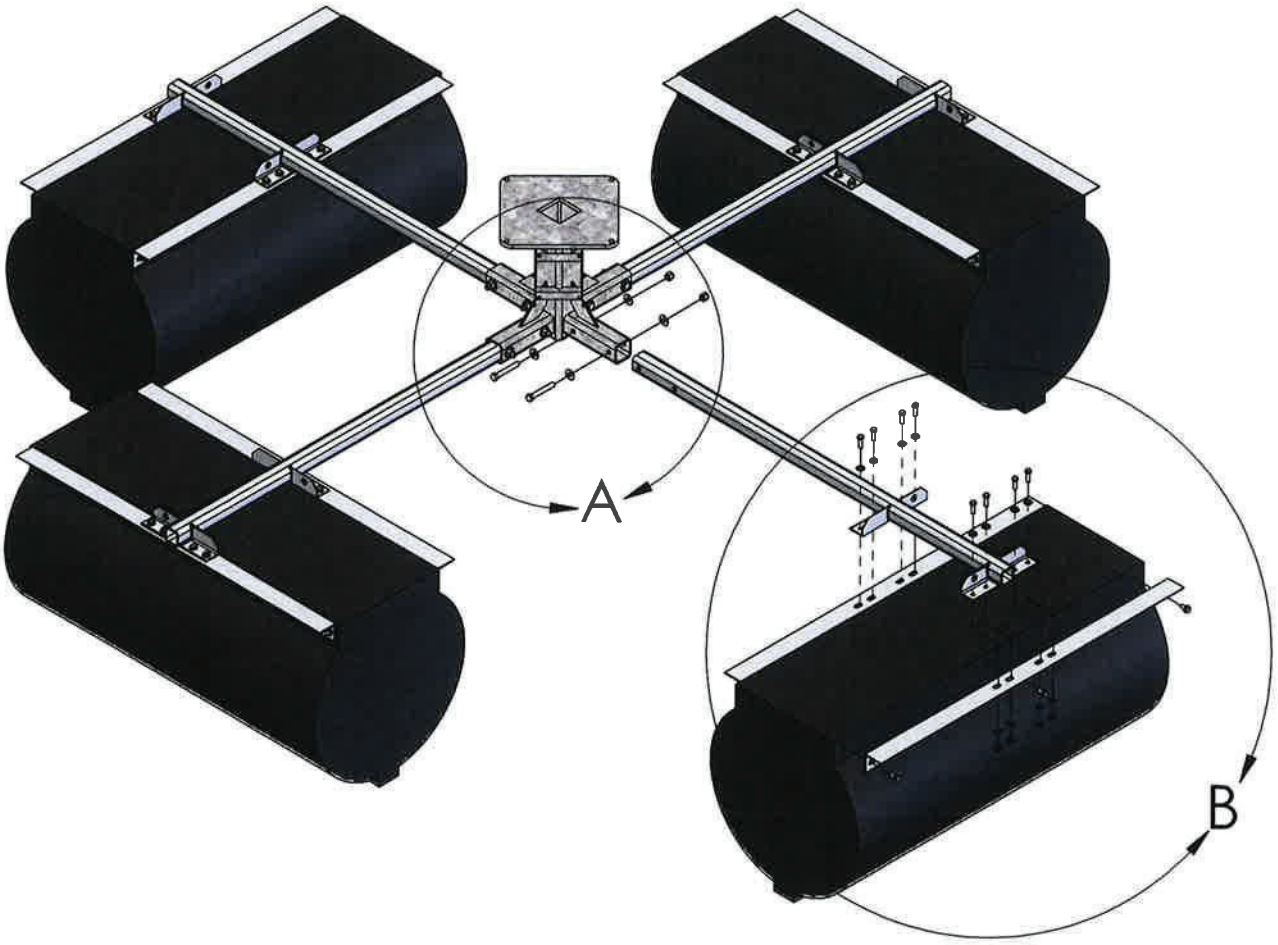
| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 420601-1 | | 420 EVAPORATOR FLOAT ADAPTOR | |
| 2 | 4 | 420602-1 | | FLOAT ARM | |
| 3 | 8 | 420603-1 | | MOUNTING ANGLE | |
| 4 | 4 | 420600-1 | | 23 IN. DIA. x 48 IN. PONTOON W/ FOAM NO VENT | |
| 5 | 16 | .50 Nom ID | | SS FLAT WASHER | |
| 6 | 64 | .38 Nom ID | | SS FLAT WASHER | |
| 7 | 8 | 1/2-13 x 3-1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 8 | 8 | 1/2-13 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 9 | 32 | 3/8-16 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 10 | 32 | 3/8-16 x 1-1/4" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 11 | 24 | 3/8-16 x 3/4" LG | | STAINLESS STEEL HEX HEAD VIBRATION PROOF SCREW | |



WEIGHT: 464.37 LB

# 420 FLOAT FRAME COMPONENTS

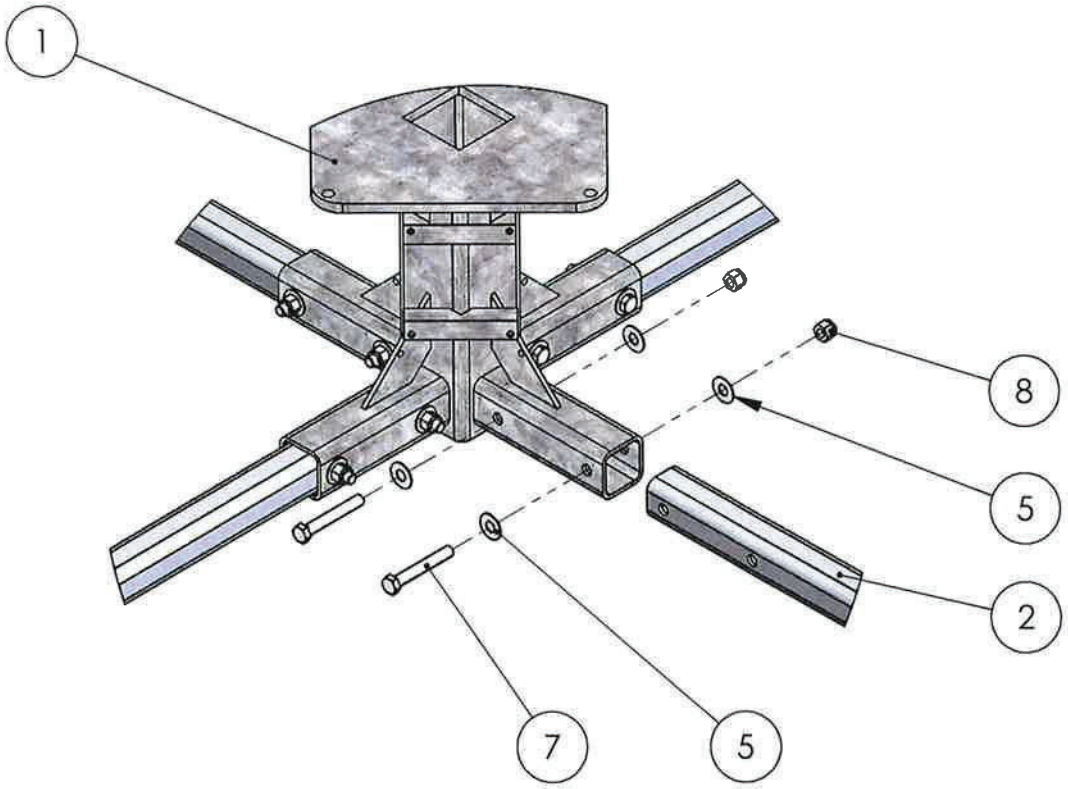
SMI Evaporative Solutions
EVAPOR.COM




# 420 FLOAT FRAME COMPONENTS

WEIGHT: 464.37 LB

SMI Evaporative Solutions
EVAPOR.COM



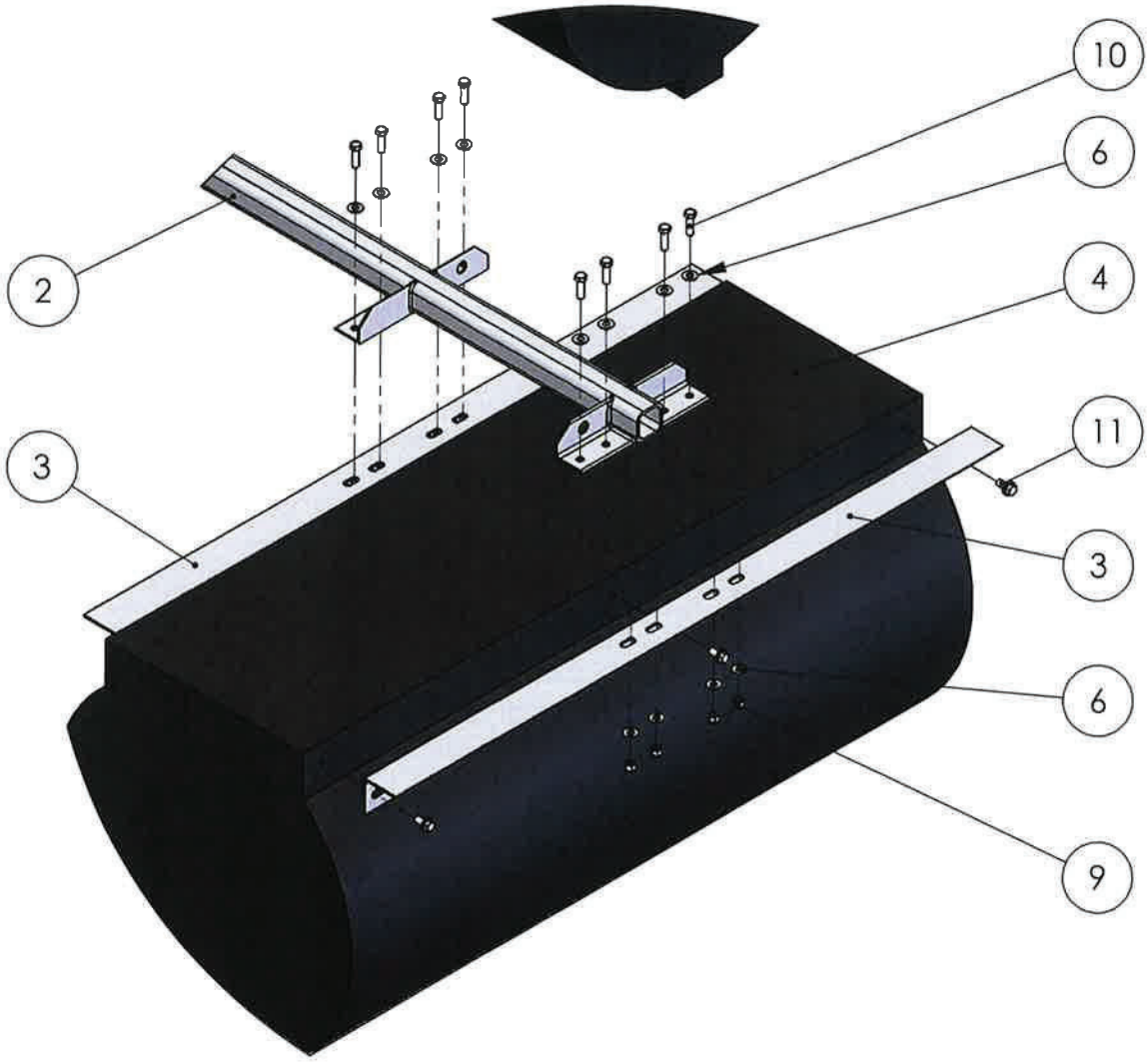

DETAIL A

# 420 FLOAT FRAME COMPONENTS

WEIGHT: 464.37 LB



SMI Evaporative Solutions
EVAPOR.COM




DETAIL B

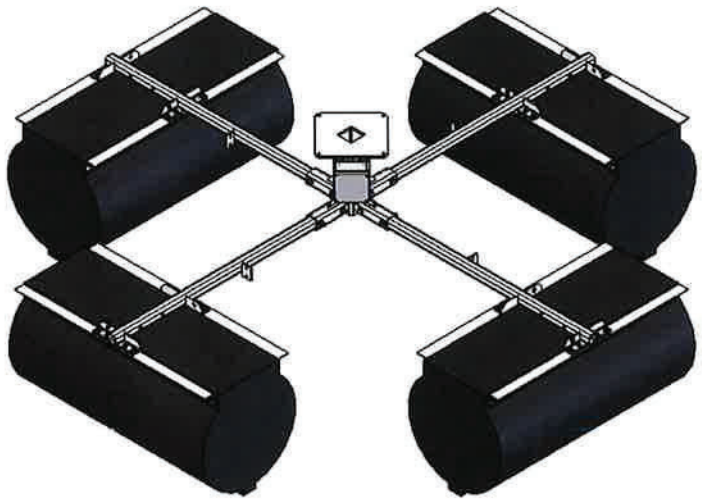
# 420 FLOAT FRAME COMPONENTS

WEIGHT: 464.37 LB

SMI Evaporative Solutions
EVAPOR.COM

# 420 FLOAT FRAME STAINLESS STEEL COMPONENTS

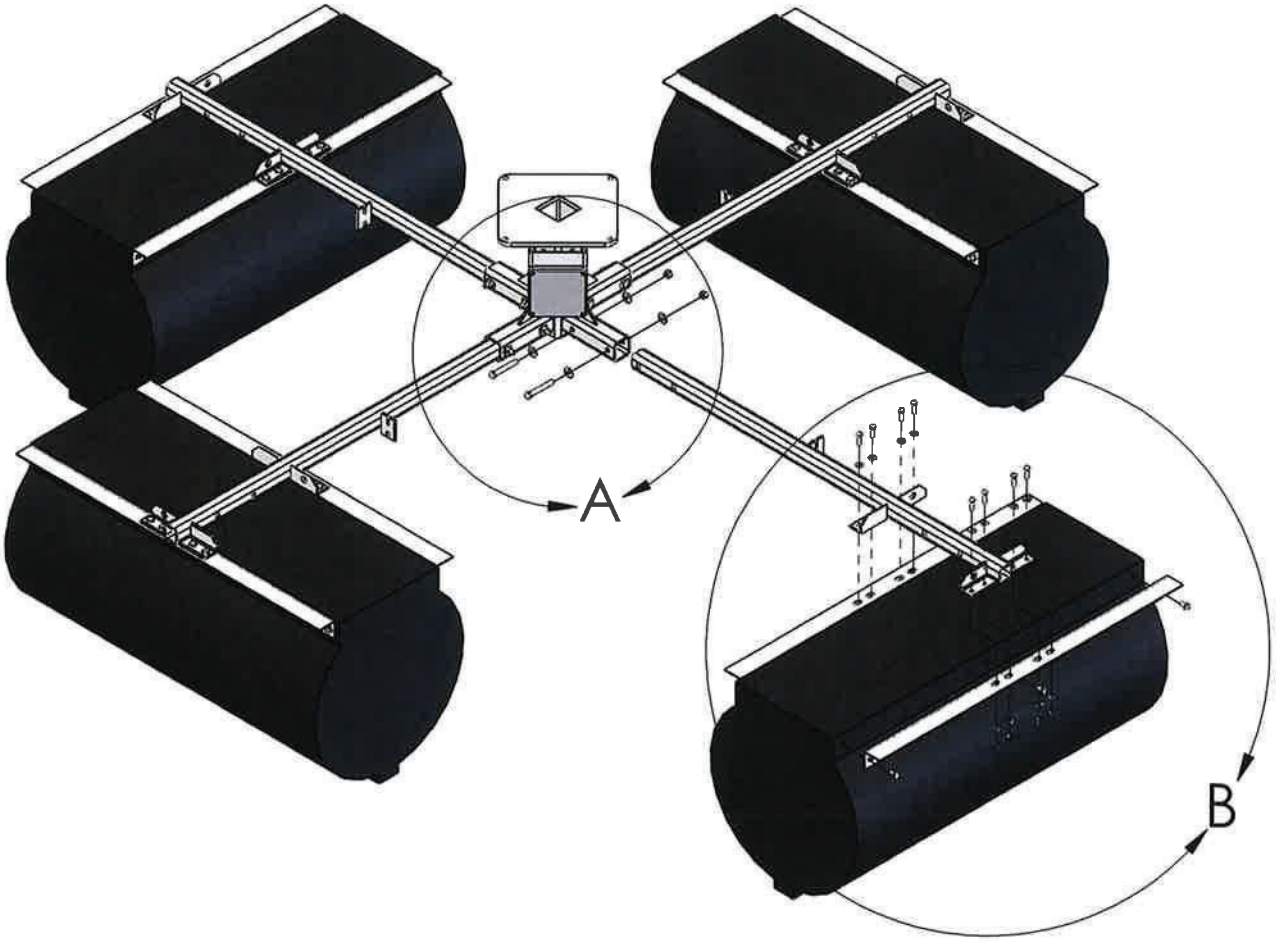
| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 4 | 420600-1 | | 23 IN. DIA. x 48 IN. PONTOON W/ FOAM NO VENT | |
| 2 | 16 | .50 Nom ID | | SS FLAT WASHER | |
| 3 | 64 | .38 Nom ID | | SS FLAT WASHER | |
| 4 | 8 | 1/2-13 x 3-1/2" LG | | HEX HEAD CAP SCREW, STAINLESS STEEL | |
| 5 | 8 | 1/2-13 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 6 | 32 | 3/8-16 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 7 | 32 | 3/8-16 x 1-1/4" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 8 | 24 | 3/8-16 x 3/4" LG | | STAINLESS STEEL HEX HEAD VIBRATION PROOF SCREW | |
| 9 | 1 | 420601-1SS | | 420 EVAPORATOR FLOAT ADAPTOR - STAINLESS STEEL | |
| 10 | 4 | 420602-1SS | | FLOAT ARM - STAINLESS STEEL | |
| 11 | 8 | 420603-1SS | | MOUNTING ANGLE - STAINLESS STEEL | |
| 12 | 2 | 27-000107 | | J-BOX | |



WEIGHT: 476.28 LB

# 420 FLOAT FRAME COMPONENTS

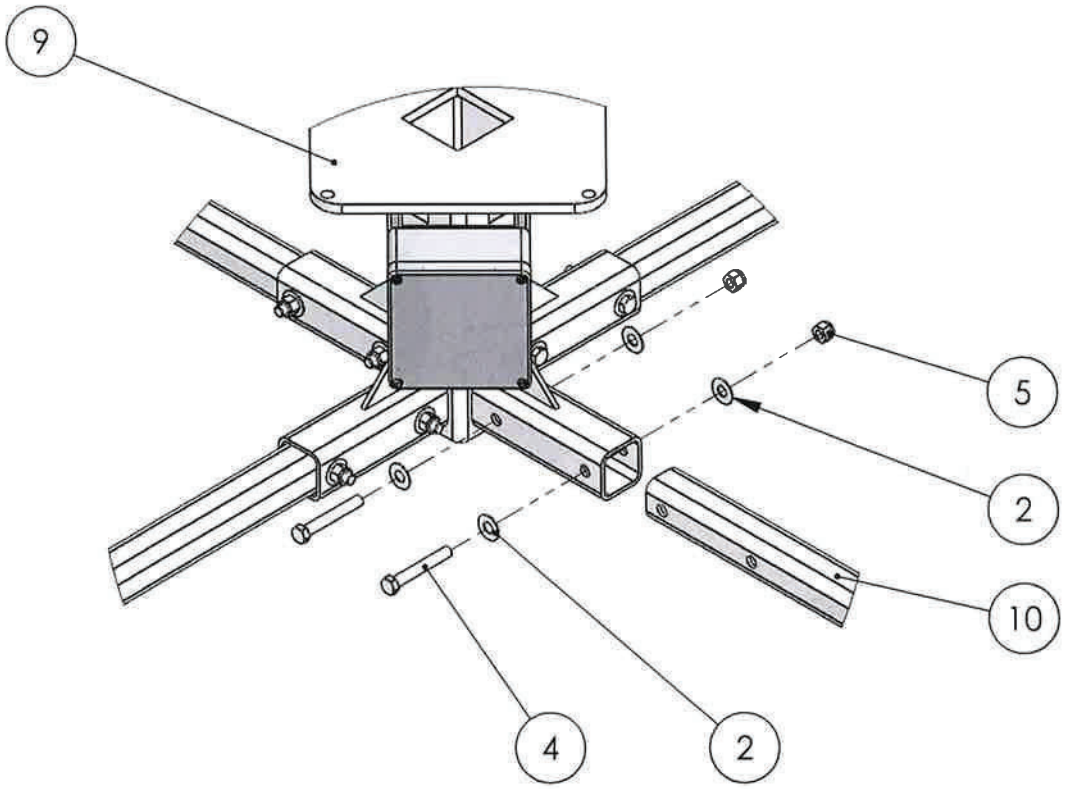
Evaporative Solutions
EVAPDR.COM




# 420 FLOAT FRAME COMPONENTS

WEIGHT: 476.28 LB

SMI Evaporative Solutions
EVAPOR.COM

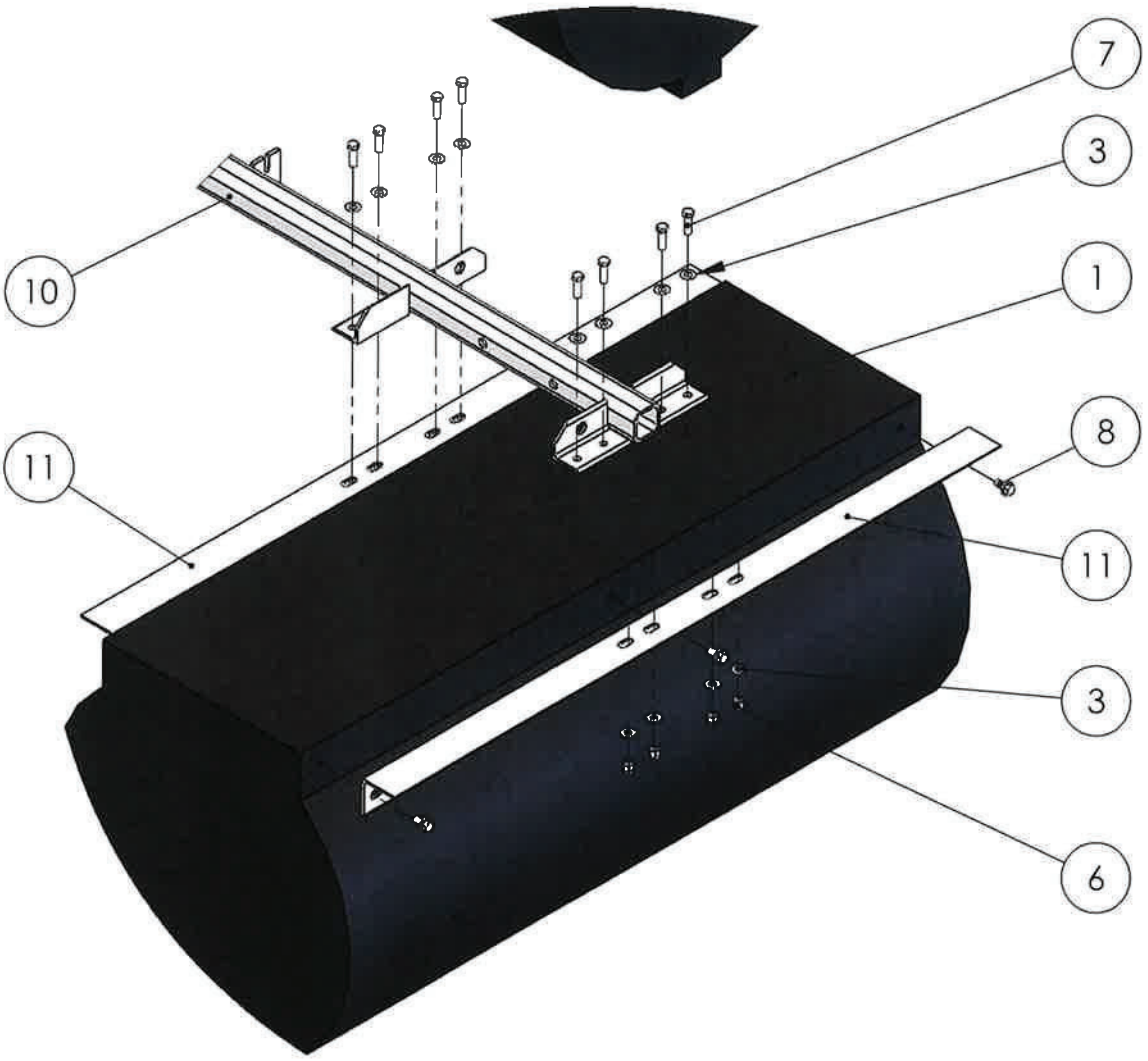



DETAIL A

# 420 FLOAT FRAME COMPONENTS

WEIGHT: 476.28 LB

SMI Evaporative Solutions
EVAPOR.COM




DETAIL B

# 420 FLOAT FRAME COMPONENTS

WEIGHT: 476.28 LB

SMI Evaporative Solutions
EVAPOR.COM

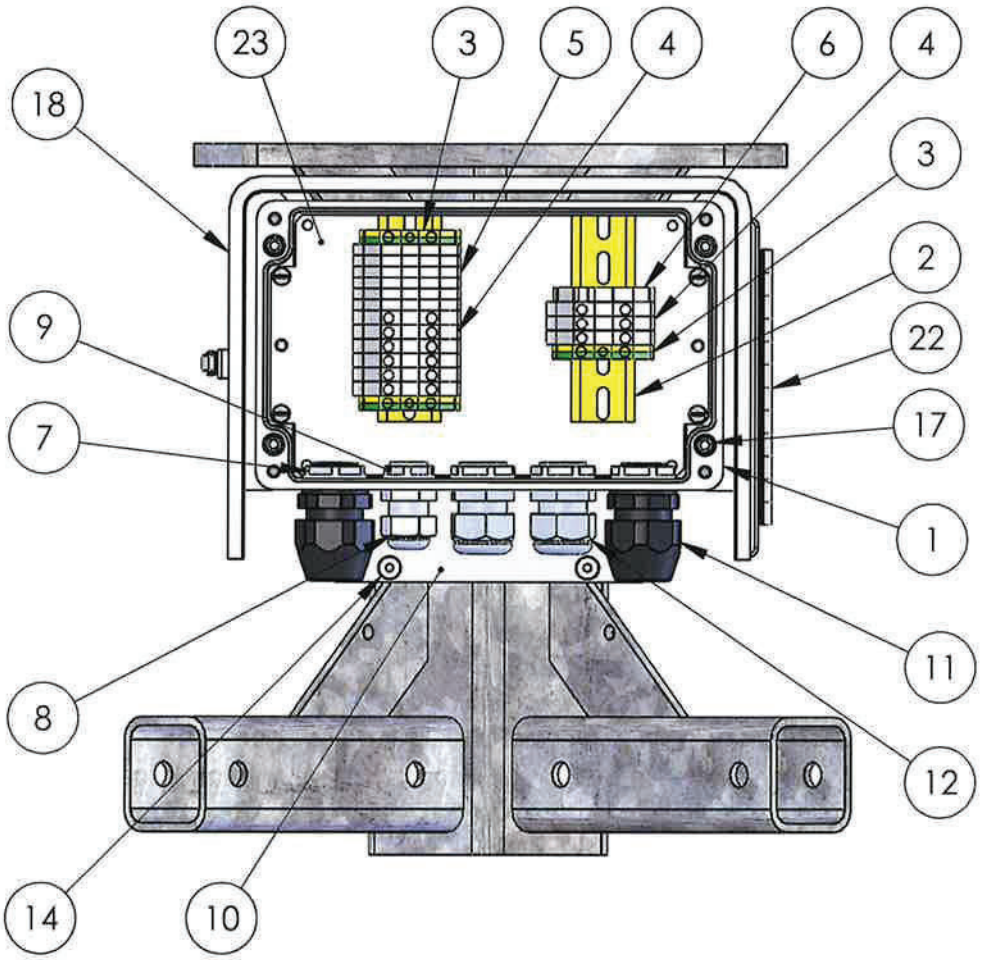
DOCUMENT NO.: 27-420FJBOX2014 REV. LEVEL: REV. DATE:

# 420 FLOAT J-BOX 2014

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 27-000113 | | J-BOX | |
| 2 | 2 | 23-000025 | | 4.50 INCH | |
| 3 | 3 | 23-004000 | | 1492 JG6 AB 6mm GROUNDING BLOCK | |
| 4 | 9 | 23-004014 | | 1492-J6 AB 6mm BOX LUG BLOCK | |
| 5 | 6 | 23-004005 | | 1492-J4 AB 4mm BOX LUG BLOCK | |
| 6 | 1 | 23-004004 | | 1492 EAJ35 END BLOCKS | |
| 7 | 4 | SHOP SUPPLIES | | 3/4" CORD GRIP RETAINING NUT | |
| 8 | 1 | SHOP SUPPLIES | | 1/2" SINGLE HOLE CORD GRIP | |
| 9 | 1 | SHOP SUPPLIES | | 1/2" CORD GRIP RETAINING NUT | |
| 10 | 1 | 420100-4 | | 420F J-BOX MOUNTING PLATE | |
| 11 | 2 | 22-007011 | | 3/4 PLASTIC CONDUIT FITTING | |
| 12 | 2 | SHOP SUPPLIES | | 3/4" SINGLE HOLE CORD GRIP | |
| 13 | 4 | 10-24 x 1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 14 | 4 | 1/4-20 x 1 1/4 LG. | | FHCS - Stainless | |
| 15 | 8 | .25 Nom ID | | SS FLAT WASHER | |
| 16 | 8 | 1/4-20 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 17 | 4 | 1/4-20 x 2" LG | | SHCS, STAINLESS STEEL | |
| 18 | 1 | 420100-5 | | 420F J-BOX GUARD | |
| 19 | 1 | 420100-6 | | 420 J-BOX GUARD COVER | |
| 20 | 1 | 10-000014 | | LATCH HOOK - 420 J-BOX | |
| 21 | 1 | 10-000015 | | LATCH - 420 J-BOX | |
| 22 | 1 | 39-840021 | | 1-1/2 WIDE HINDGE | |
| 23 | 1 | 27-000113BP | | 420F J-BOX BACK PLATE | |

WEIGHT: LB/ KG

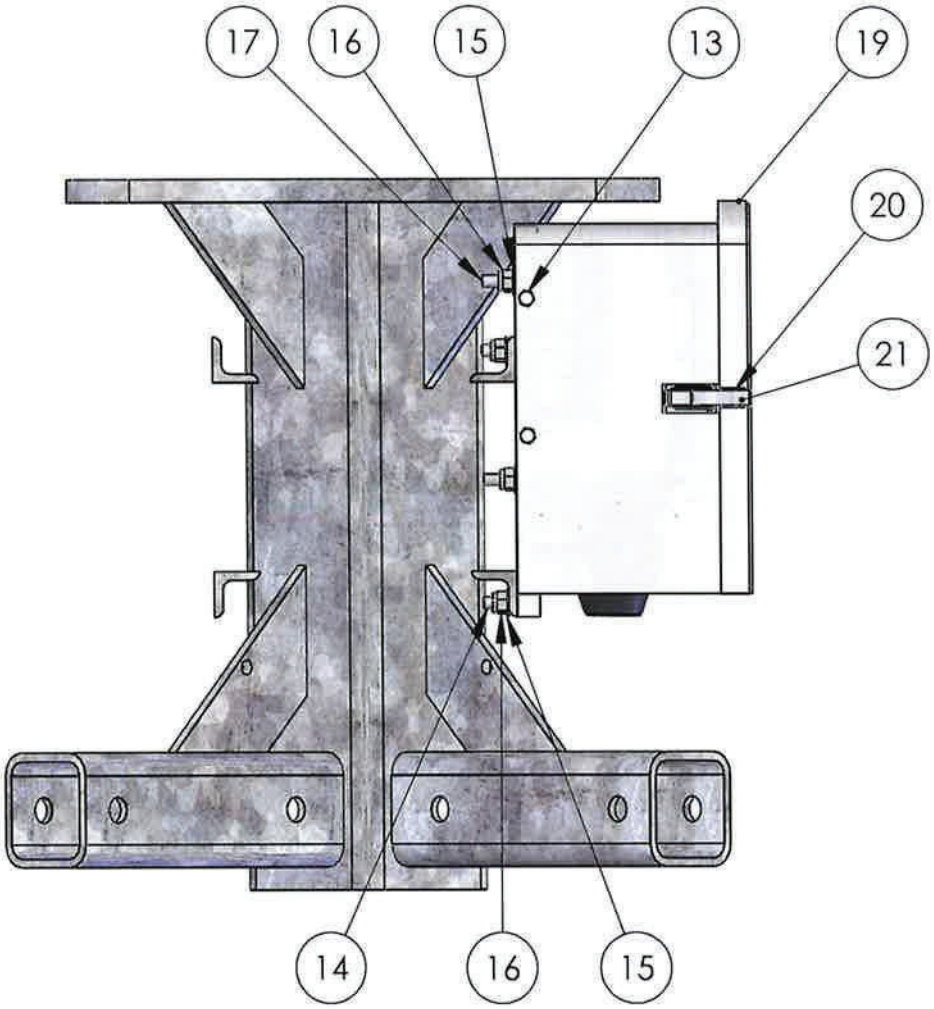
SCALE: 1:24 SHEET 1 OF 3




## 420 FLOAT J-BOX 2014

WEIGHT: 92.13 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM




## 420 FLOAT J-BOX 2014

WEIGHT: 92.13 LB/ KG

SCALE: 1:24 SHEET 3 OF 3

# 420 EVAPORATOR HEAD ASM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 420200-1 | | 420 EVAPORATOR ENCLOSURE | |
| 2 | 2 | 420200-4 | | 420 SPRAY MANIFOLD CLAMP UN-THREADED | |
| 3 | 2 | 420200-6 | | 420 SPRAY MAN. CLAMP/THREADED | |
| 4 | 1 | 420200-5 | | 420 EVAPORATOR SHROUD | |
| 5 | 1 | 420201-1 | | 420 EVAPORATOR SLINGER | |
| 6 | 1 | 28-000420 | | 25HP 460-415/60/50 286TD 420 STYLE EVAPORATOR MOTOR | |
| | | 28-000420H | | 25HP 460-415/60/50 286TD 120V INTERNAL HEATER 420 STYLE EVAPORATOR MOTOR | |
| | | 28-000421 | | 25HP 575V/60 286TD 420 STYLE EVAPORATOR MOTOR | |
| 7 | 1 | 20-440S21400220 | | 24VDC Vib. Sensor 0.2-3.0 in/sec | |
| 8 | 1 | 340206-2 | | FAN RETAINING RING | |
| 9 | 1 | 320540-1 | | FAN COVER PLATE | |
| 10 | 1 | 320565-2 | | FAN COVER SPRING CLIP | |
| 11 | 7 | SHOP SUPPLIES | | 1/2" LOCK WASHER | |
| 12 | 1 | 1/2-13 x 1-1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 13 | 2 | 1/2-13 x 1" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 14 | 4 | 1/2-13 x 1-1/4" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 15 | 8 | .38 Nom ID | | SS FLAT WASHER | |
| 16 | 2 | .50 Nom ID | | SS FLAT WASHER | |
| 17 | 4 | .19 Nom ID | | SS FLAT WASHER | |
| 18 | 4 | 3/8-16 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |

WEIGHT: LB

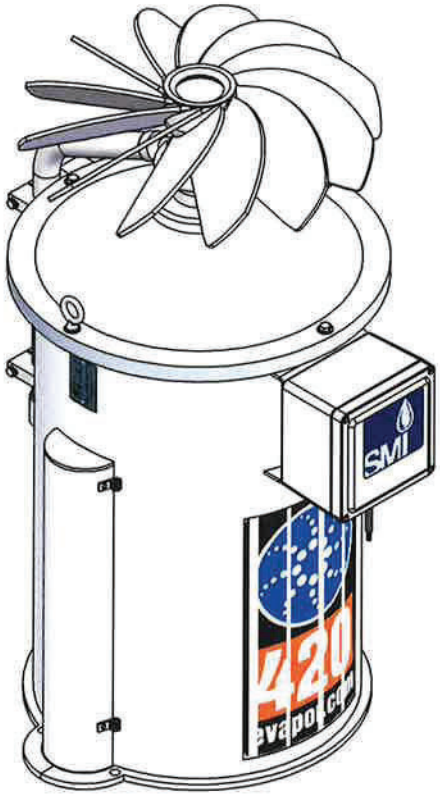
# 420 EVAPORATOR HEAD ASM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 19 | 4 | 5/16-18 x 2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 20 | 3 | 5/16-18 x 3/4" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 21 | 1 | 27-CL707W | | VIBRATION SWITCH FIBERGLASS J-BOX | |
| 22 | 1 | 420200-7 | | Vibration Switch Junction Box Enclosure Mounting Plate (Switch to Box) | |
| 23 | 1 | 420100-1 | | 420 STYLE EVAP SPRAY MANIFOLD | |
| 24 | 1 | 1/2-13 x 3/4 | | STAINLESS STEEL SOCKET SET SCREW | |
| 25 | 2 | 3/8-16 x 1-1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 26 | 1 | 25-000046 | | 18/8 FLEX CONTROL CABLE | |
| 27 | 4 | 10-24 x 1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 28 | 2 | 10-000042 | | 3/8 SS EYEBOLT | |
| 29 | 4 | SHOP SUPPLIES | | #10-32 x 3/4"LG | |
| 30 | 4 | SHOP SUPPLIES | | 5/16 SS LOCK WASHER | |
| 31 | 1 | 61-999004S | | 3/8 316 SS SOCKET HEAD PIPE PLUG | |
| 32 | 1 | 05-420EVAP | | EVAP 420 16 x 9 | |
| 33 | 1 | 05-420001 | | 420 RAINDROP DECAL REFLECTIVE | |
| 34 | 1 | 05-000100 | | 420 EVAPORATOR /SERIAL # PLATE | |
| 35 | 2 | 23-001050 | | 1/2 AVECO CLAMP | |
| 36 | 3 | 22-007010 | | 3/4" FLEX CONDUIT (FT) | |
| | 16 | | | 3/4" FLEXIBLE CONDUIT (FT - BOOM) | |
| 37 | 1 | SHOP SUPPLIES | | 1" TO 3/4" BUSHING | |

WEIGHT: LB

# 420 EVAPORATOR HEAD ASM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 38 | 1 | 22-008001 | | 3/4" CONDUIT LOCKNUT | |
| 39 | 1 | SHOP SUPPLIES | | 3/4" STEEL FERRULE | |
| 40 | 1 | SHOP SUPPLIES | | 3/4" 90DEG CONDUIT ELBOW | |
| 41 | 1 | 340003-2M | | PRE-COATED 20 SS EVAP FAN | |

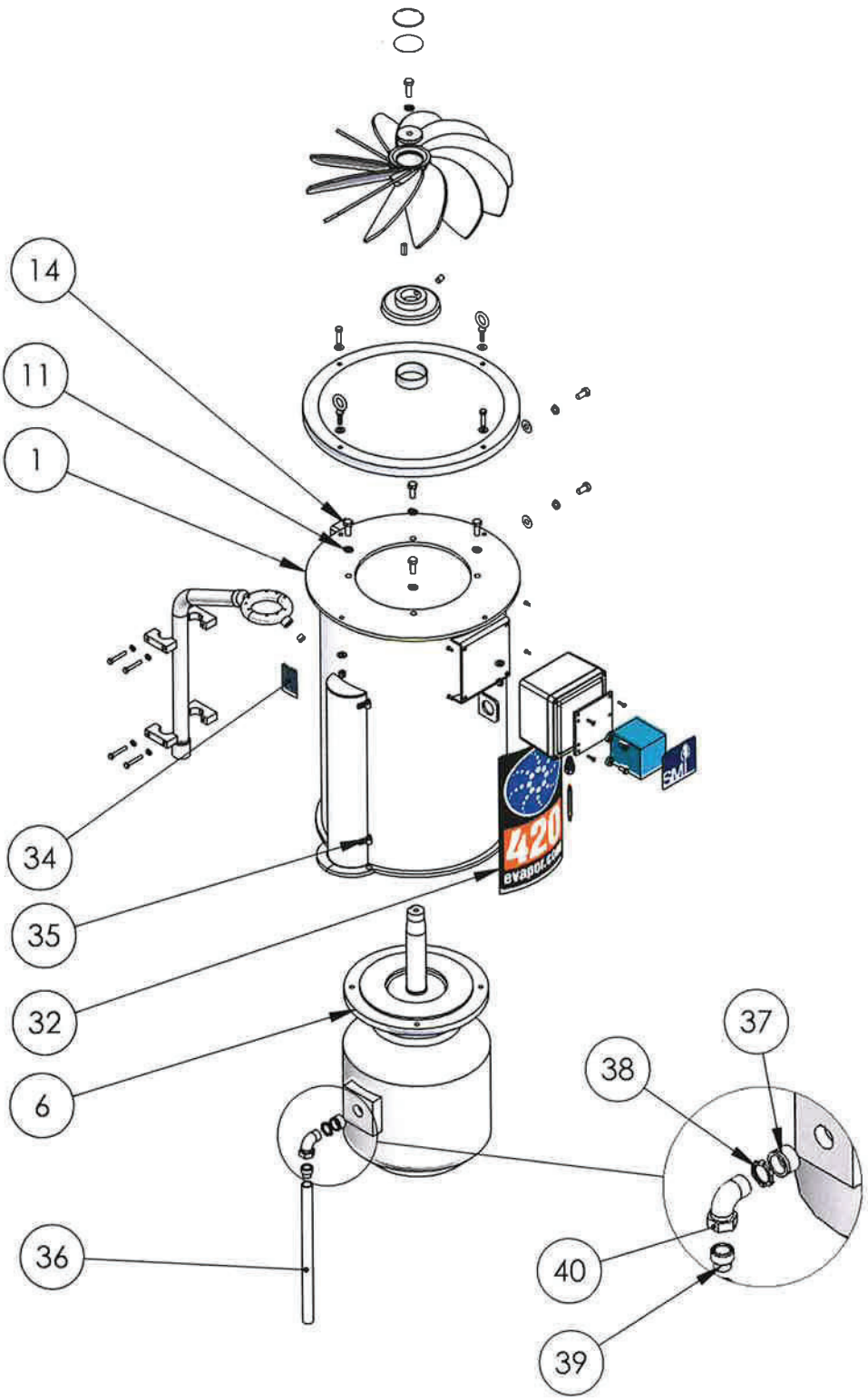



# 420 EVAPORATOR HEAD ASM

WEIGHT: 616.95 LB



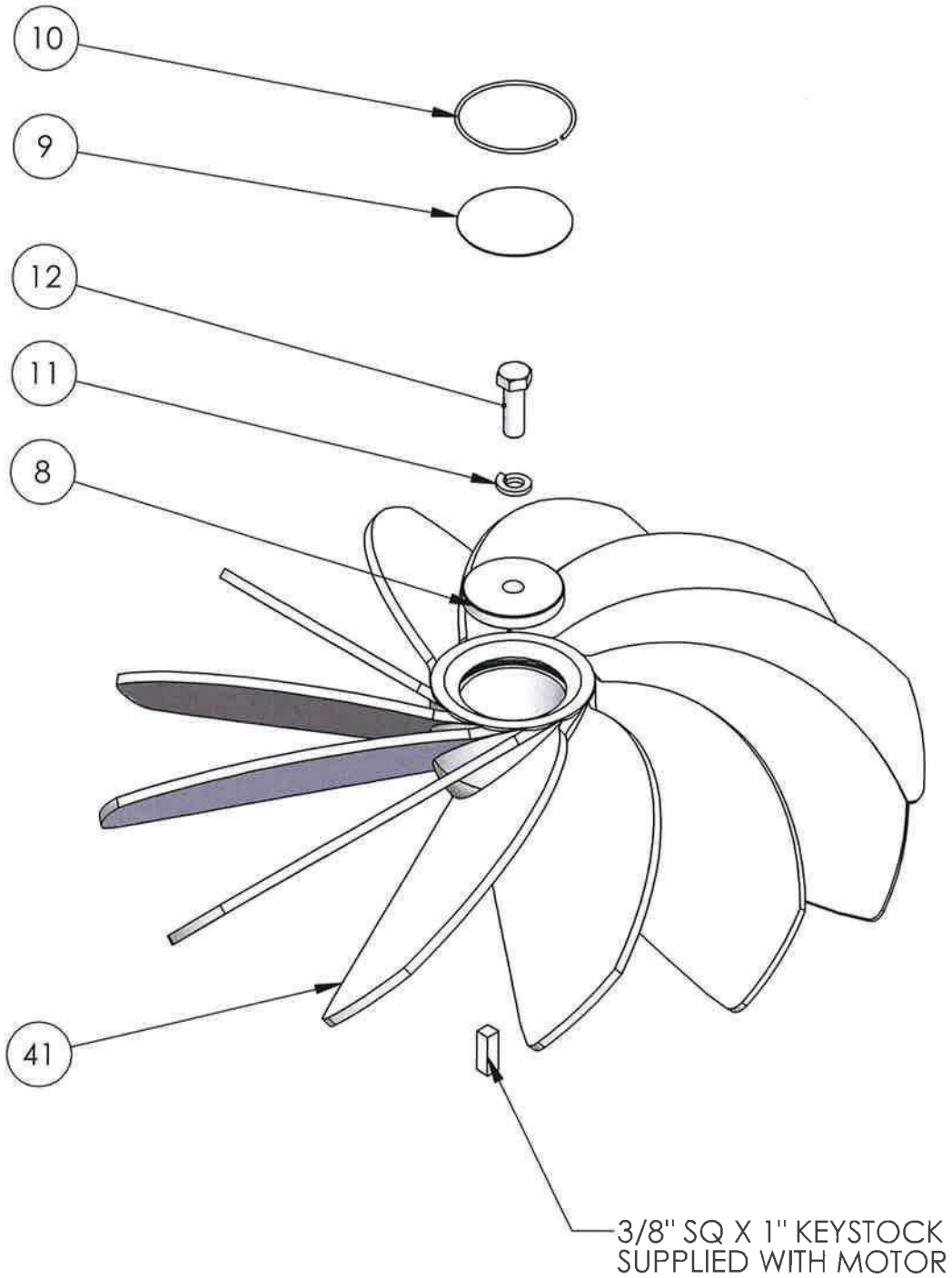
SMI Evaporative Solutions
EVAPOR.COM




# 420 EVAPORATOR HEAD ASM

WEIGHT: 616.95 LB

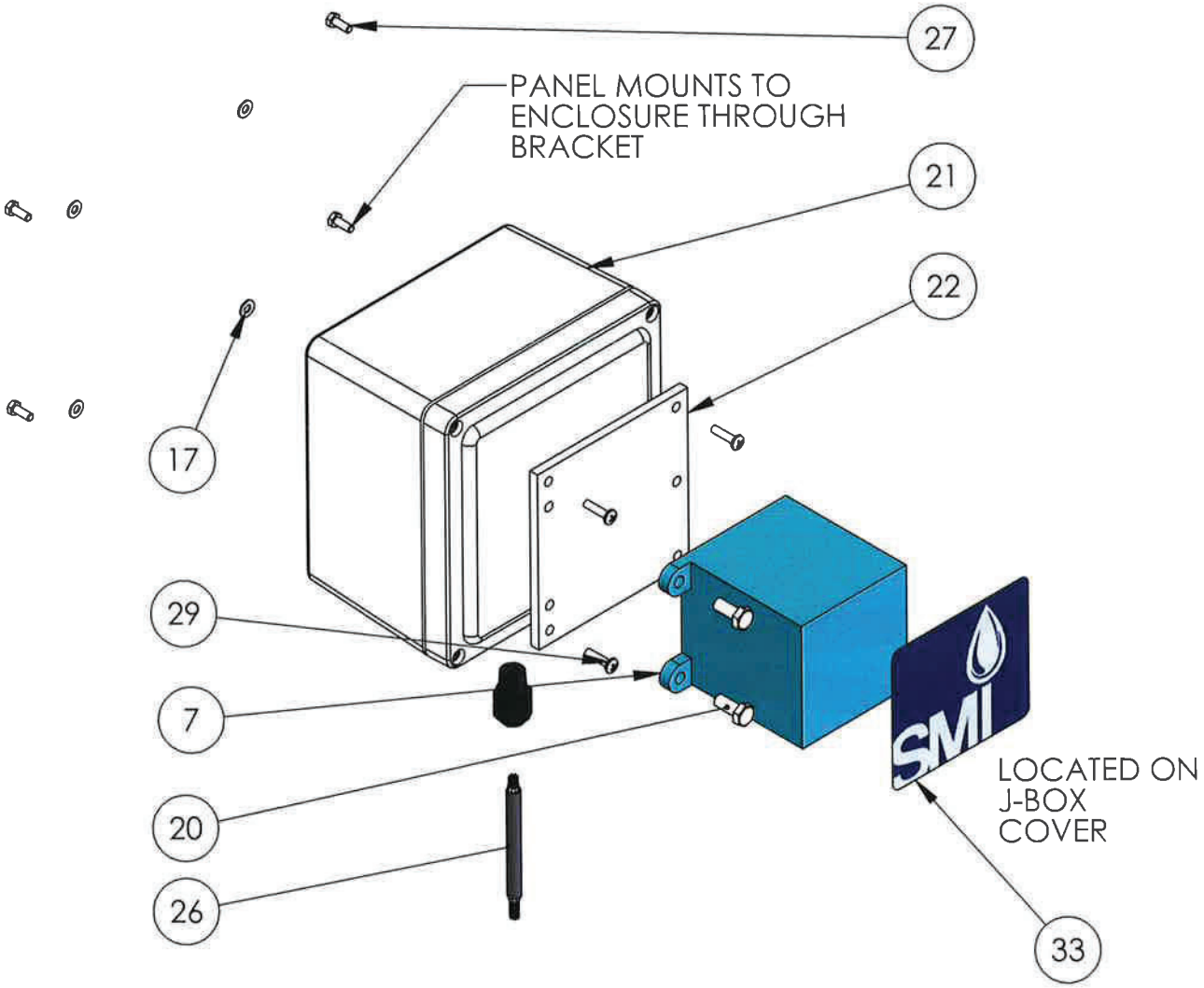
SMI Evaporative Solutions
EVAPOR.COM




# 420 EVAPORATOR HEAD ASM

WEIGHT: 616.95 LB

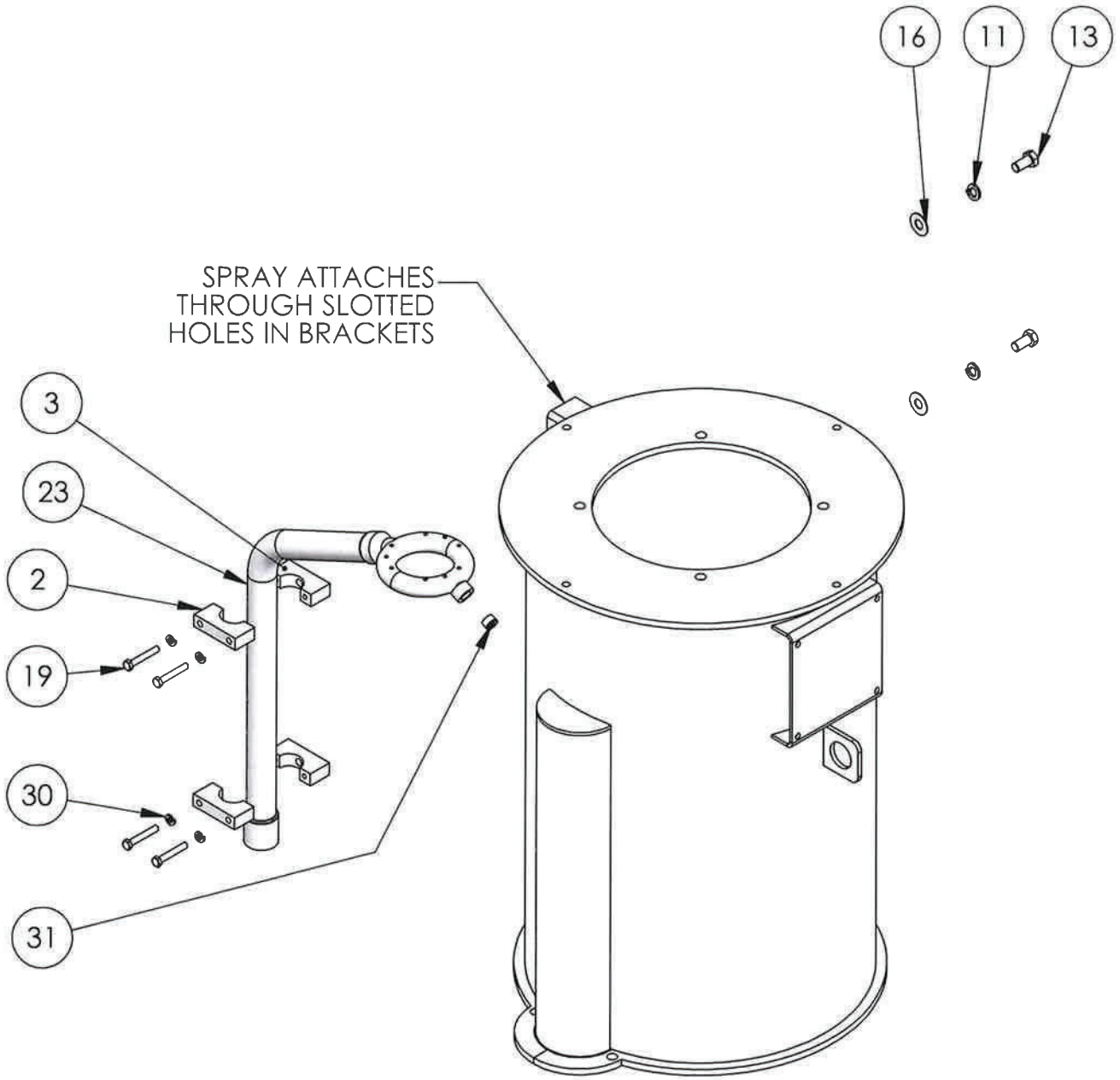
Evaporative Solutions
EVAPOR.COM




# 420 EVAPORATOR HEAD ASM

WEIGHT: 616.95 LB

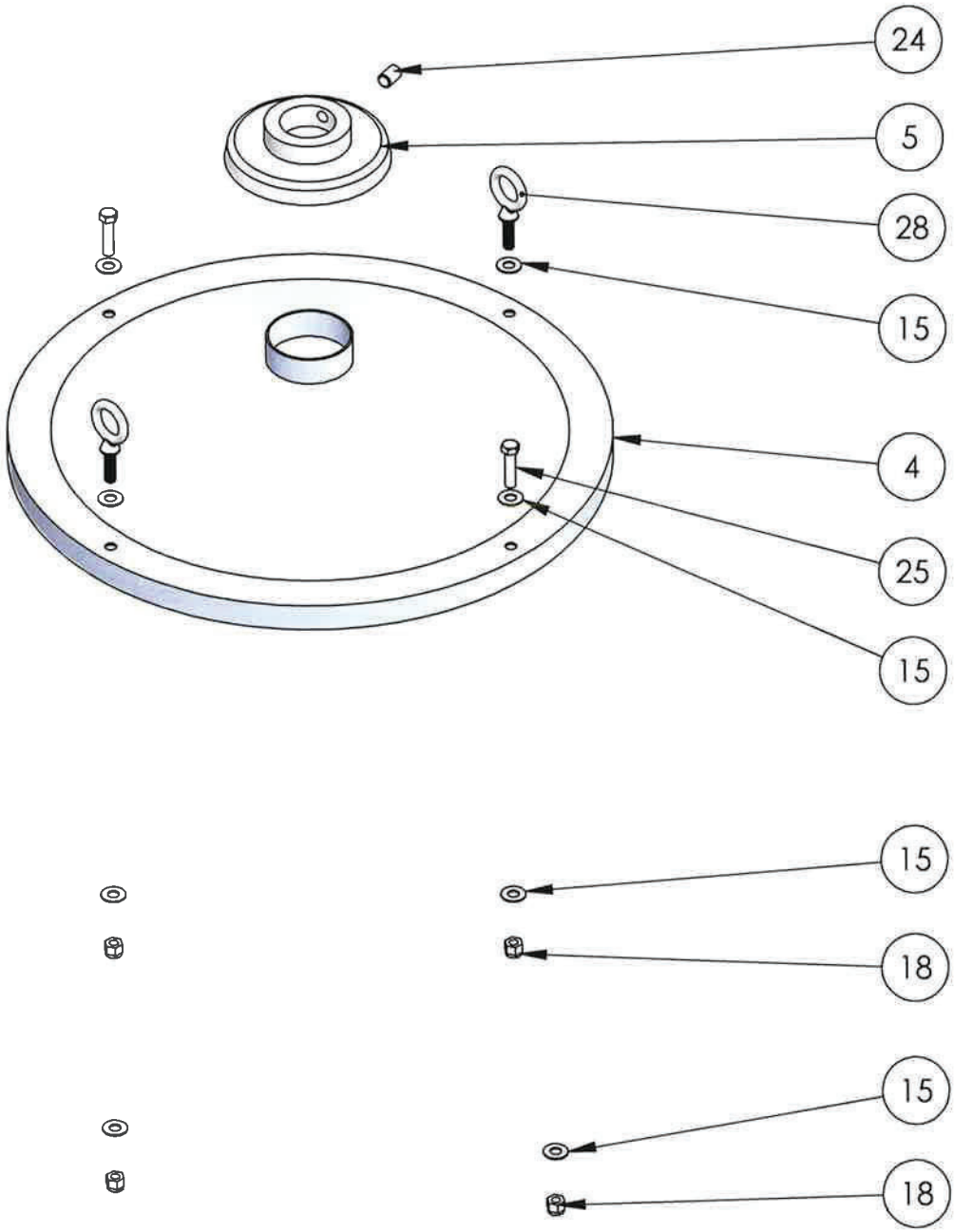
SMI Evaporative Solutions
EVAPOR.COM




# 420 EVAPORATOR HEAD ASM

WEIGHT: 616.95 LB

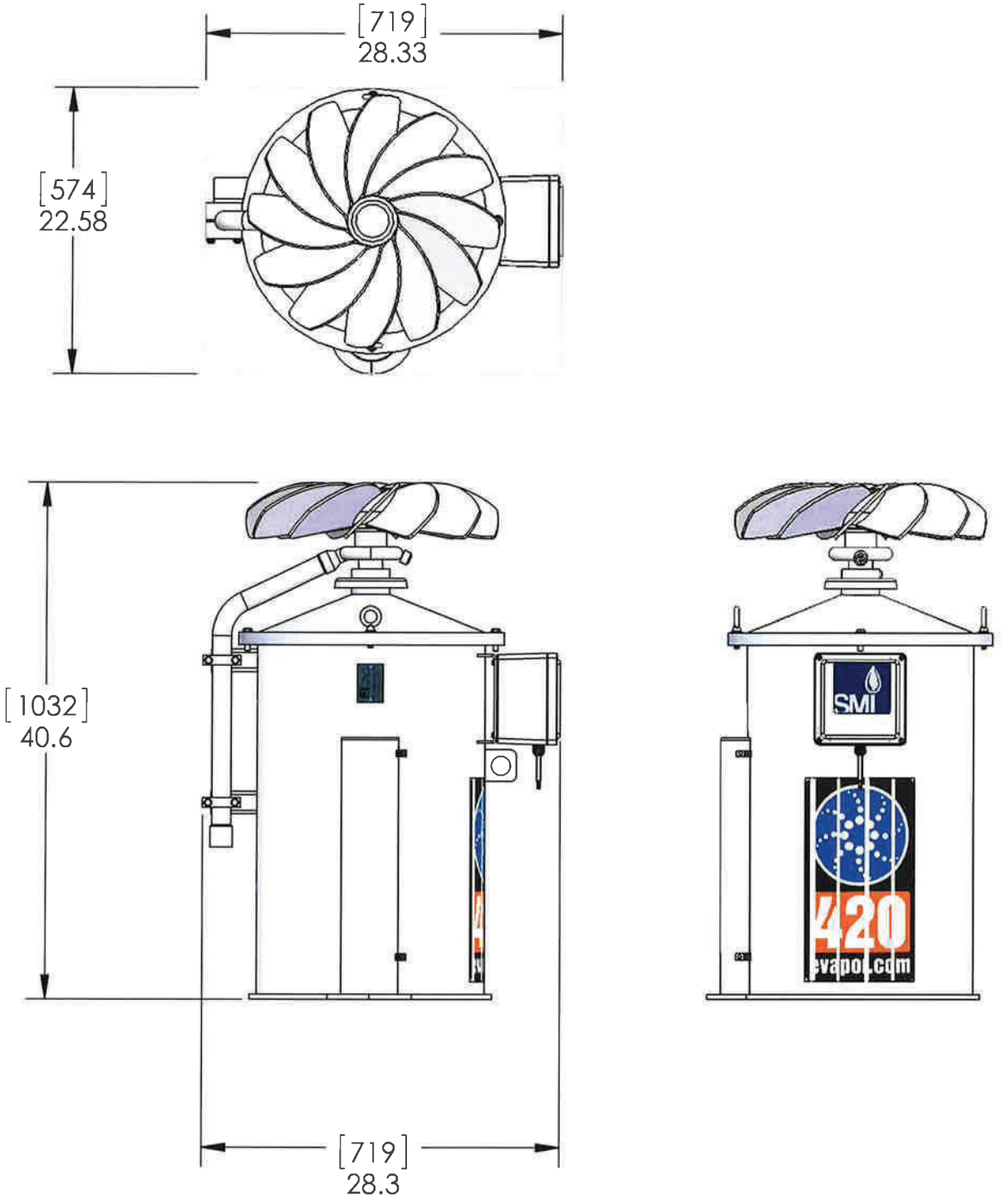
SMI Evaporative Solutions
EVAPOR.COM




# 420 EVAPORATOR HEAD ASM

WEIGHT: 616.95 LB

SMI Evaporative Solutions
EVAPOR.COM




# 420 EVAPORATOR HEAD ASM

WEIGHT: 616.95 LB

SMI Evaporative Solutions
EVAPOR.COM

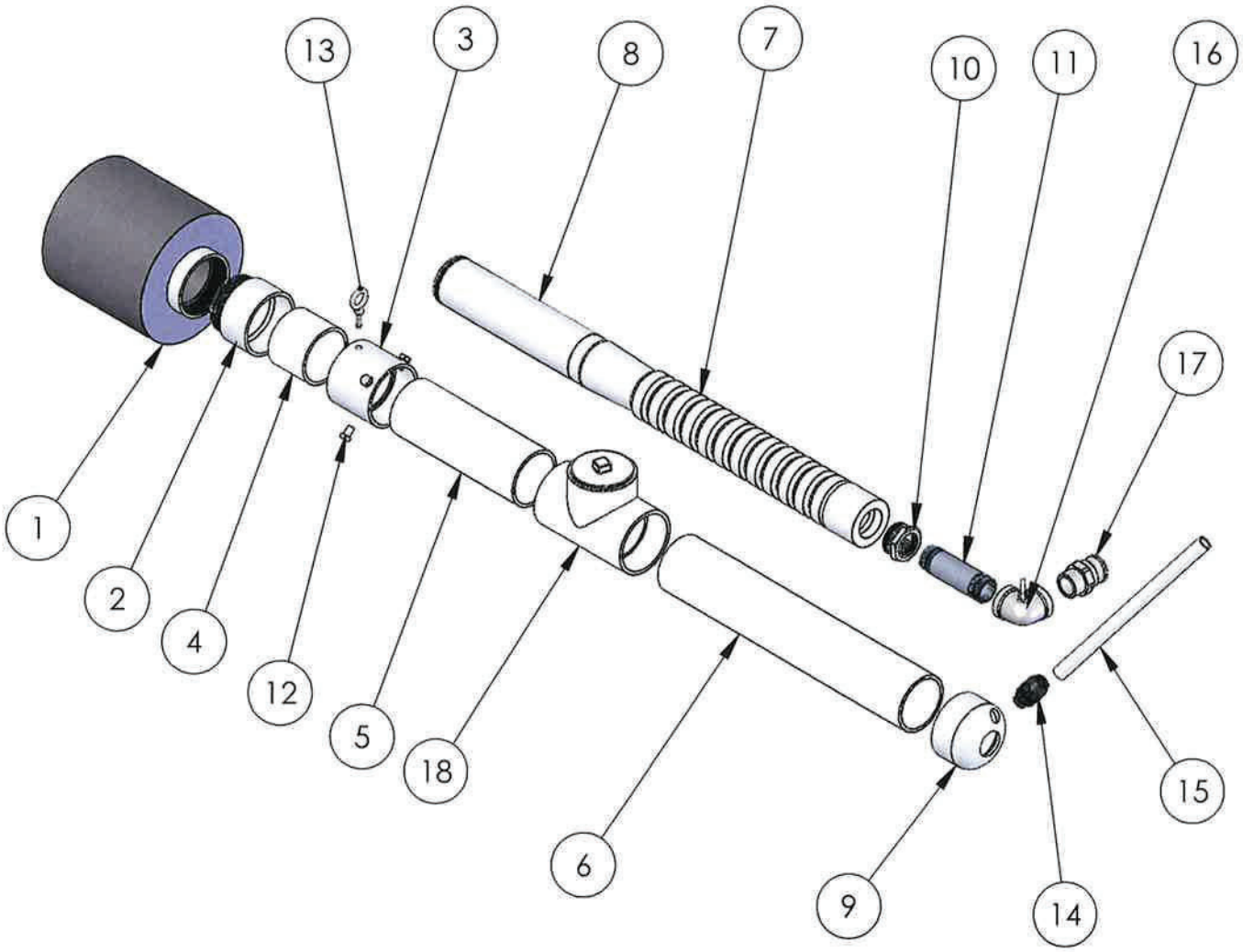
DOCUMENT NO.: 420-2HP-FILTER REV. LEVEL: REV. DATE:

# 2HP 60 HZ PUMP SLEEVE W/FILTER - 2014

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 420604-7 | | 2 HP 4" PUMP SLEEVE FILTER | |
| 2 | 1 | 67-000021 | | 4" PVC THREADED ADAPTER | |
| 3 | 1 | 67-000019 | | 4" PVC STRAIGHT COUPLER | |
| 4 | 1 | 67-000017-4 | | 3.5 LG. SCHED 40 PVC PIPE | |
| 5 | 1 | 67-000017-4 | | 12.5 LG. SCHED 40 PVC PIPE | |
| 6 | 1 | 67-000017-4 | | 24.5 LG. SCHED 40 PVC PIPE | |
| 7 | 1 | 63-2.0/400/50 | | 2HP, 50Hz, 9 STAGE SUBMERSIBLE PUMP | |
| 8 | 1 | 63-2.0/400/50M | | 2hp 400V 50Hz PUMP MOTOR | |
| 9 | 1 | 67-000018 | | 4" PVC CAP | |
| 10 | 1 | 61-006004SS | | 2" TO 1-1/2" STAINLESS STEEL REDUCER BUSHING | |
| 11 | 1 | 61-001030 | | 1-1/2" x 6" SS NIPPLE | |
| 12 | 4 | 1/2-13 x 3/4" LG | | HEX HEAD CAP SCREW, STAINLESS STEEL | |
| 13 | 1 | 10-000042 | | 3/8 SS EYEBOLT | |
| 14 | 1 | 22-007011 | | 3/4 PLASTIC CONDUIT FITTING | |
| 15 | 3 | 22-007010 | | 3/4" FLEX CONDUIT (FT) | |
| 16 | 1 | 420605-1 | | ELBOW AND EYE NUT ASSEMBLY | |
| 17 | 1 | 60-101152 | | 1 1/2 TYPE F QD - STAINLESS STEEL | |
| 18 | 1 | 67-000020 | | 4" CLEANOUT TEE & PLUG | |

WEIGHT: LB/ KG

SCALE: 1:16 SHEET 1 OF 2




## 2HP 50 HZ PUMP SLEEVE W/FILTER - 2014

WEIGHT: 61.78 LB/ KG

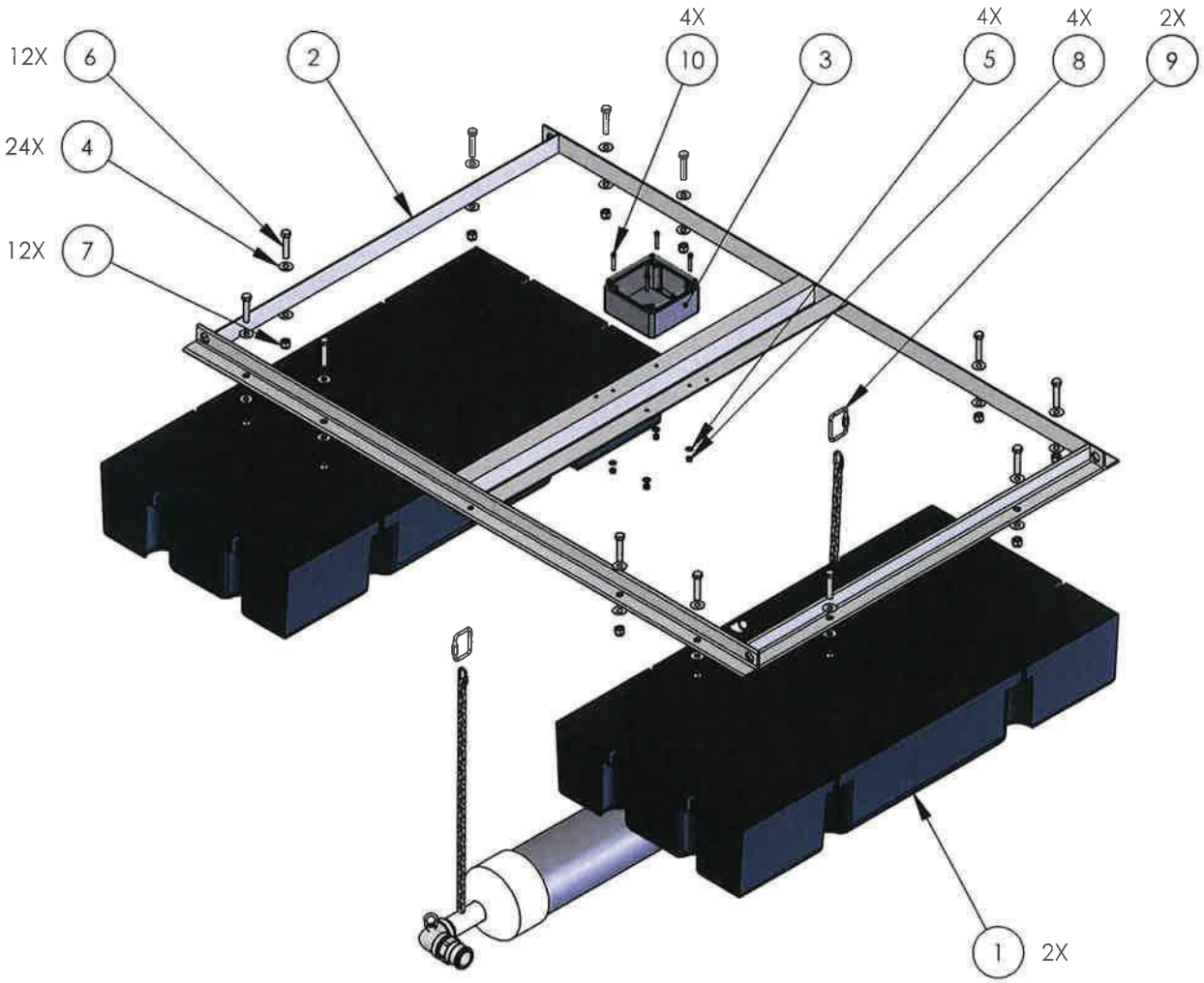
SMI Evaporative Solutions
EVAPOR.COM

DOCUMENT NO.: 420-FLOAT-PUMP REV. LEVEL: REV. DATE:

PUMP FLOAT ASM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 2 | 420600-2 | | SCOTTCO MARINE FLOAT DRUM | |
| 2 | 1 | 420606-1 | | FLOAT FRAME | |
| 3 | 1 | 27-000107 | | J-BOX | |
| 4 | 24 | .50 Nom ID | | SS FLAT WASHER | |
| 5 | 4 | .25 Nom ID | | SS FLAT WASHER | |
| 6 | 12 | 1/2-13 x 2-1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 7 | 12 | 1/2-13 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 8 | 4 | 1/4-20 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 9 | 2 | 10-000046 | | 5/16 SS SQUARE QUICK LINK | |
| 10 | 4 | 1/4-20 x 1-1/2" LG | | SHCS, STAINLESS STEEL | |

WEIGHT: LB

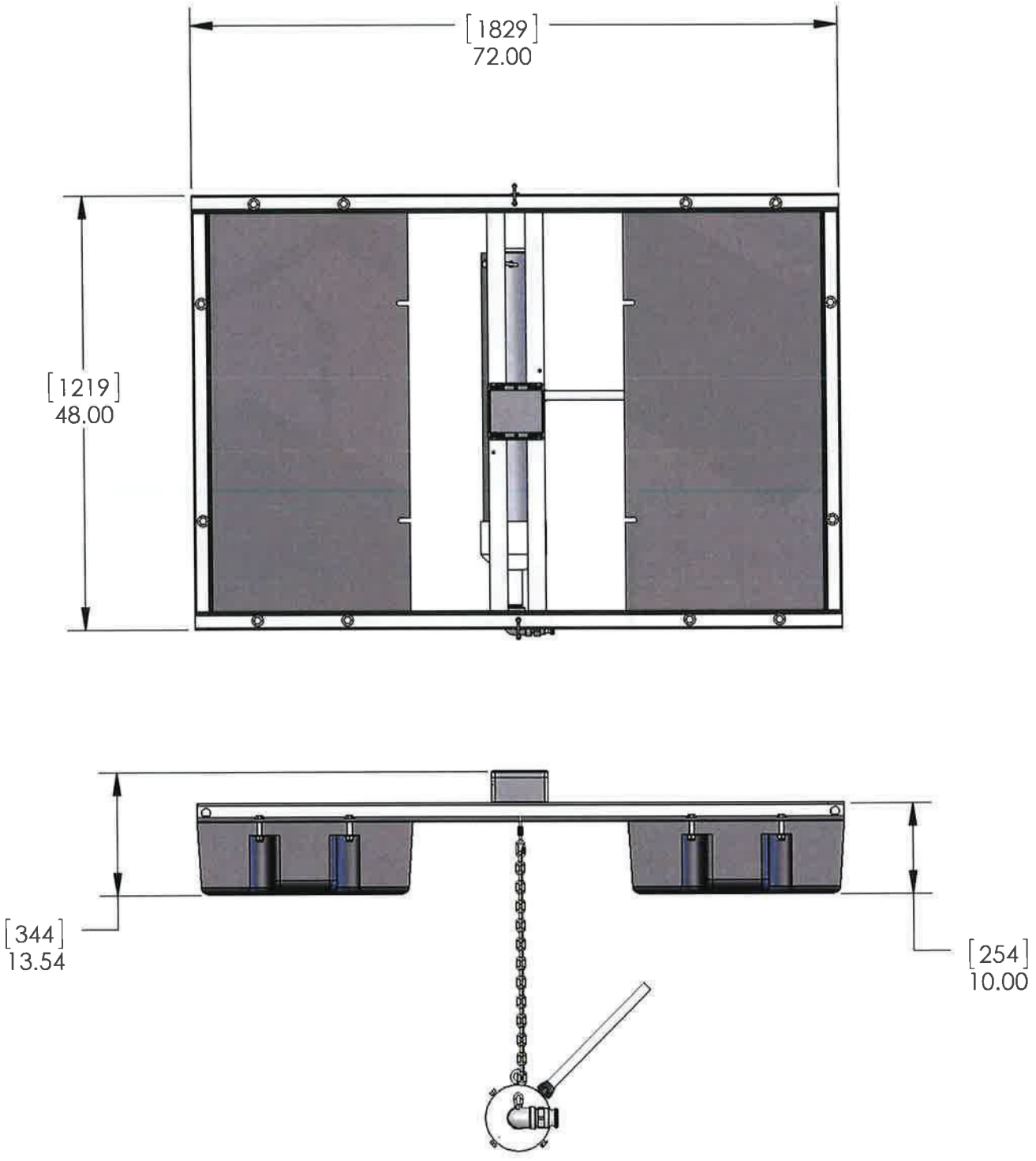



SIZE OF PUMP PROVIDED PER CUSTOMER REQUEST, CHAIN AND QUICK LINKS INCLUDED IN EACH PUMP ASSEMBLY

# PUMP FLOAT ASM

WEIGHT: 197.95 LB

SMI Evaporative Solutions
EVAPOR.COM



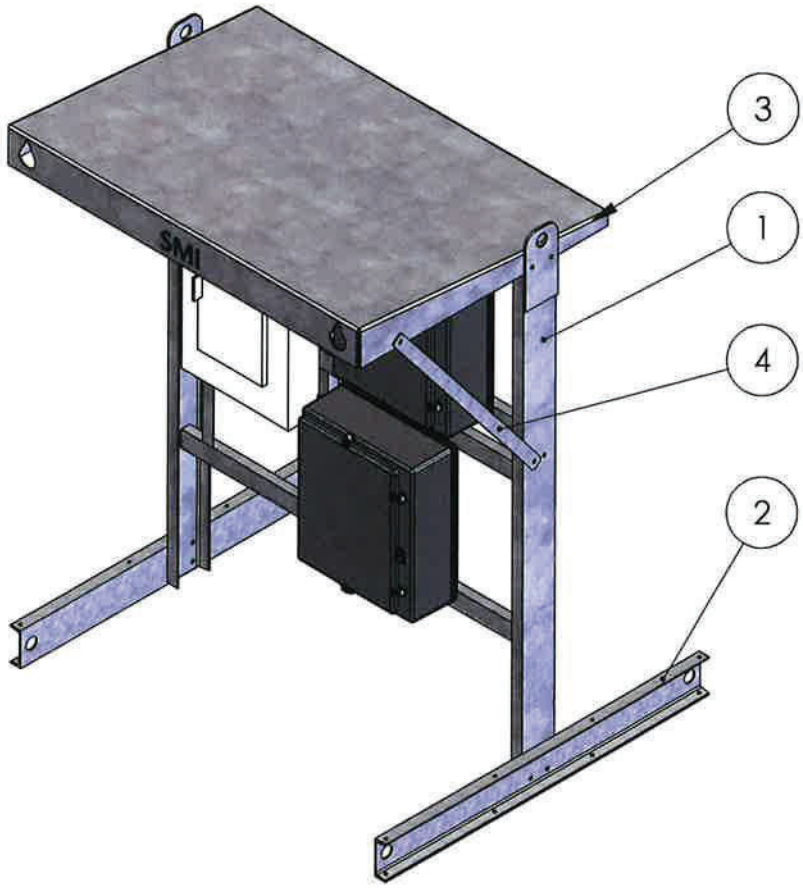

WEIGHT: 197.95 LB

# PUMP FLOAT ASM



SMI Evaporative Solutions
EVAPOR.COM

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 425200-2 | | 5.5FT WIDE SHELTER FRAME | |
| 2 | 2 | 425100-1 | | SHELTER LEG | |
| 3 | 1 | 425300-2 | | 5.5 FT SHELTER ROOF | |
| 4 | 2 | 425100-2 | | SHELTER ROOF BRACE | |



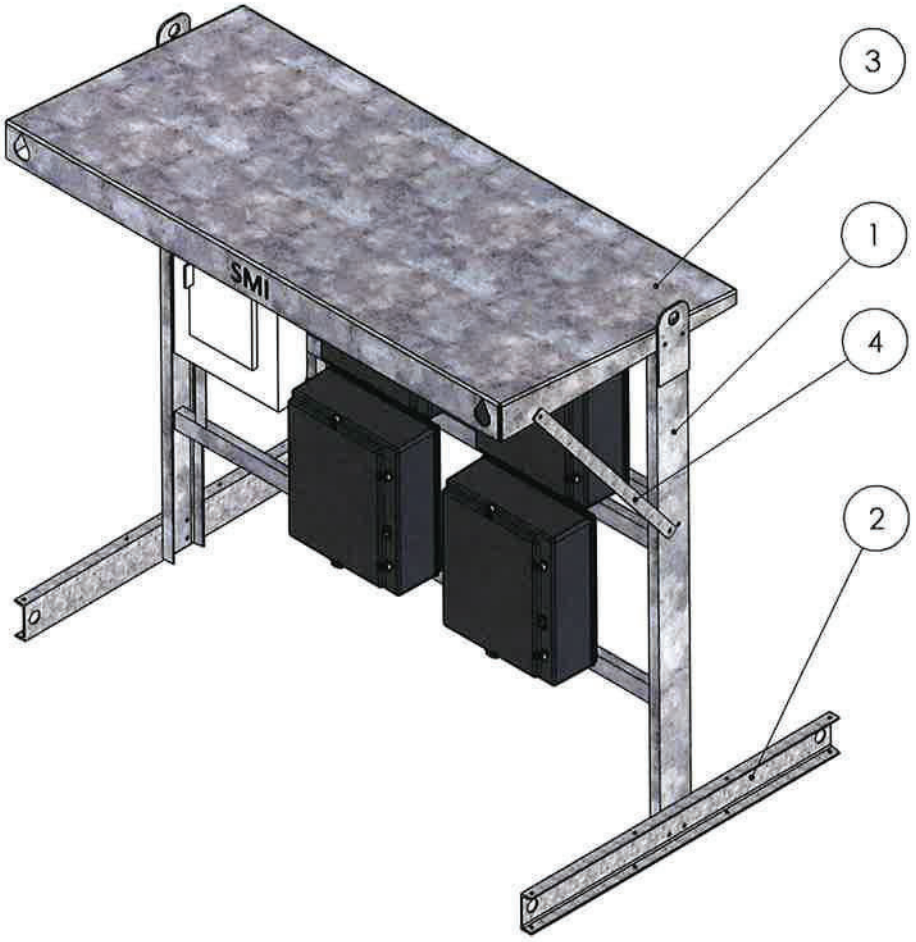

# 5.5FT GALVANIZED PANEL SHELTER ASM

WEIGHT: 1969.88 LB

SMI Evaporative Solutions
EVAPOR.COM

8FT GALVANIZED PANEL SHELTER ASM

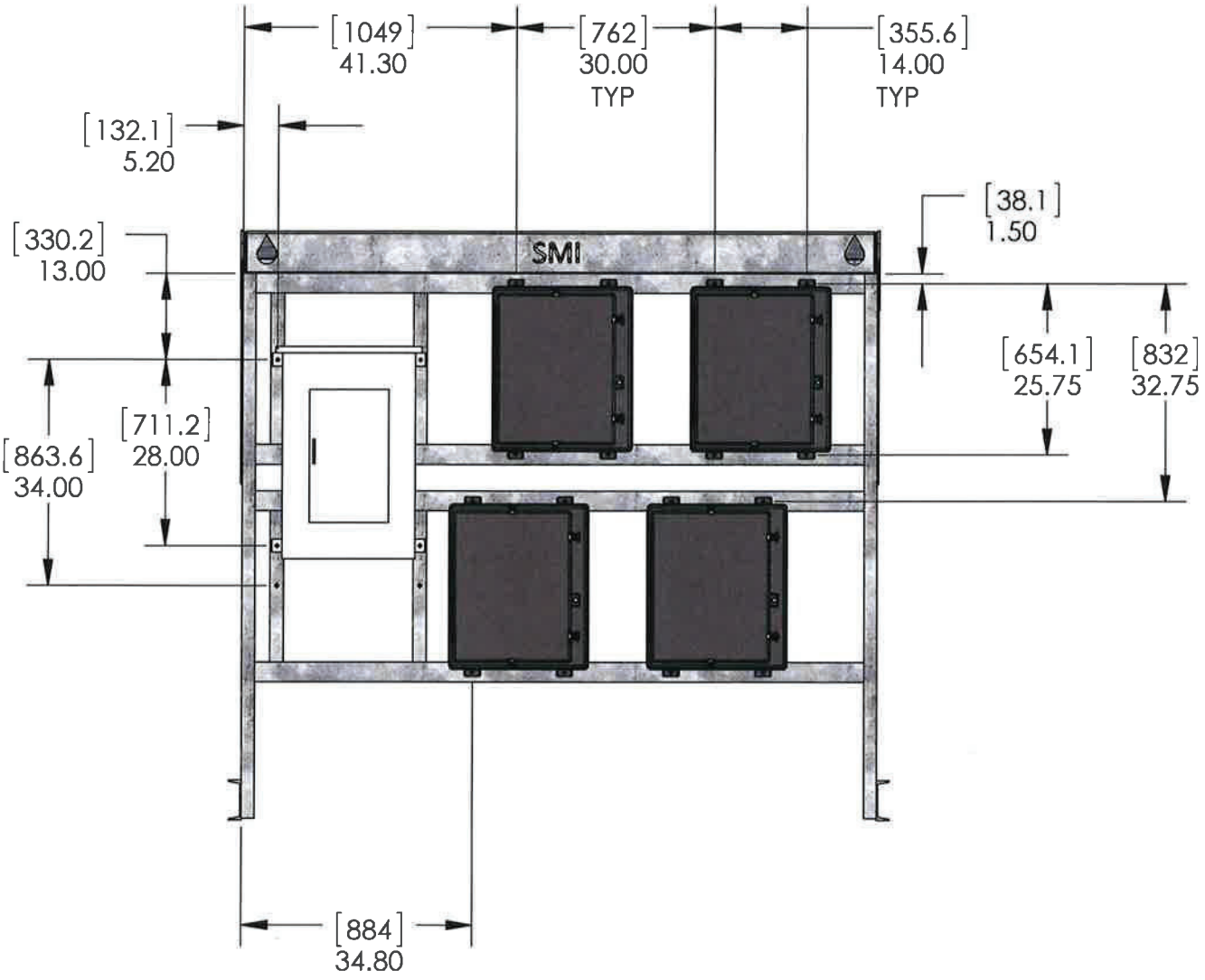
| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 425200-1 | | 8FT WIDE SHELTER FRAME | |
| 2 | 2 | 425100-1 | | SHELTER LEG | |
| 3 | 1 | 425300-1 | | 8 FT SHELTER ROOF | |
| 4 | 2 | 425100-2 | | SHELTER ROOF BRACE | |




## 8FT GALVANIZED PANEL SHELTER ASM

WEIGHT: 2380.62 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM




## 8FT GALVANIZED PANEL SHELTER ASM

WEIGHT: 2380.62 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM

DOCUMENT NO.: 27-340113.M.1 REV. LEVEL: REV. DATE:

# 420F EVAPORATOR MASTER CONTROL PANEL

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 27-N20168HWT | | STAHLIN NEMA 4X FBGLS ENCLOSURE | |
| 2 | 1 | 27-BP2016CS | | BP2016CS STAHLIN STEEL BACK PANEL | |
| 3 | 1 | 27-BV4XKIT | | BV4XKIT STAHLIN BREATHER VENT | |
| 4 | 1 | 23-1291166 | | MC25X37WH2 WIRING DUCT | |
| 5 | 2 | 23-1291166 | | MC25X37WH2 WIRING DUCT | |
| 6 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 7 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 8 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 9 | 1 | 26-000142 | | 115/230 24V 100VA TRANSFORMER | |
| 10 | 1 | 20-CS10.241 | | CS10.241 PULS 24VDC 240W PS | |
| 11 | 1 | 20-UBC10.241 | | UBC10.241 PULS DC UPS W/BATTERY | |
| 12 | 6 | 23-004004 | | 1492 EAJ35 END BLOCKS | |
| 13 | 1 | 20-DIN_RECEPT | | 1671K13 DIN DUPLEX RECEPTACLE | |
| 14 | 1 | 20-SD-15A-24 | | MW SD-15A-24 DC-DC CONVERTER | |
| 15 | 12 | 23-004005 | | 1492-J4 AB 4mm BOX LUG BLOCK | |
| 16 | 1 | 23-004000 | | 1492 JG6 AB 6mm GROUNDING BLOCK | |
| 17 | 1 | 20-108TX | | 104TX N-TRON ETHERNET SWITCH | |
| 18 | 1 | 06-HMI5121P | | HMI5121P MAPLE 12.1" TOUCH HMI | |
| 19 | 1 | 06-1762-IF4 | | 4 CHANNEL ANALOG INPUT 1100/1200/1400 MICROLOGIX | |

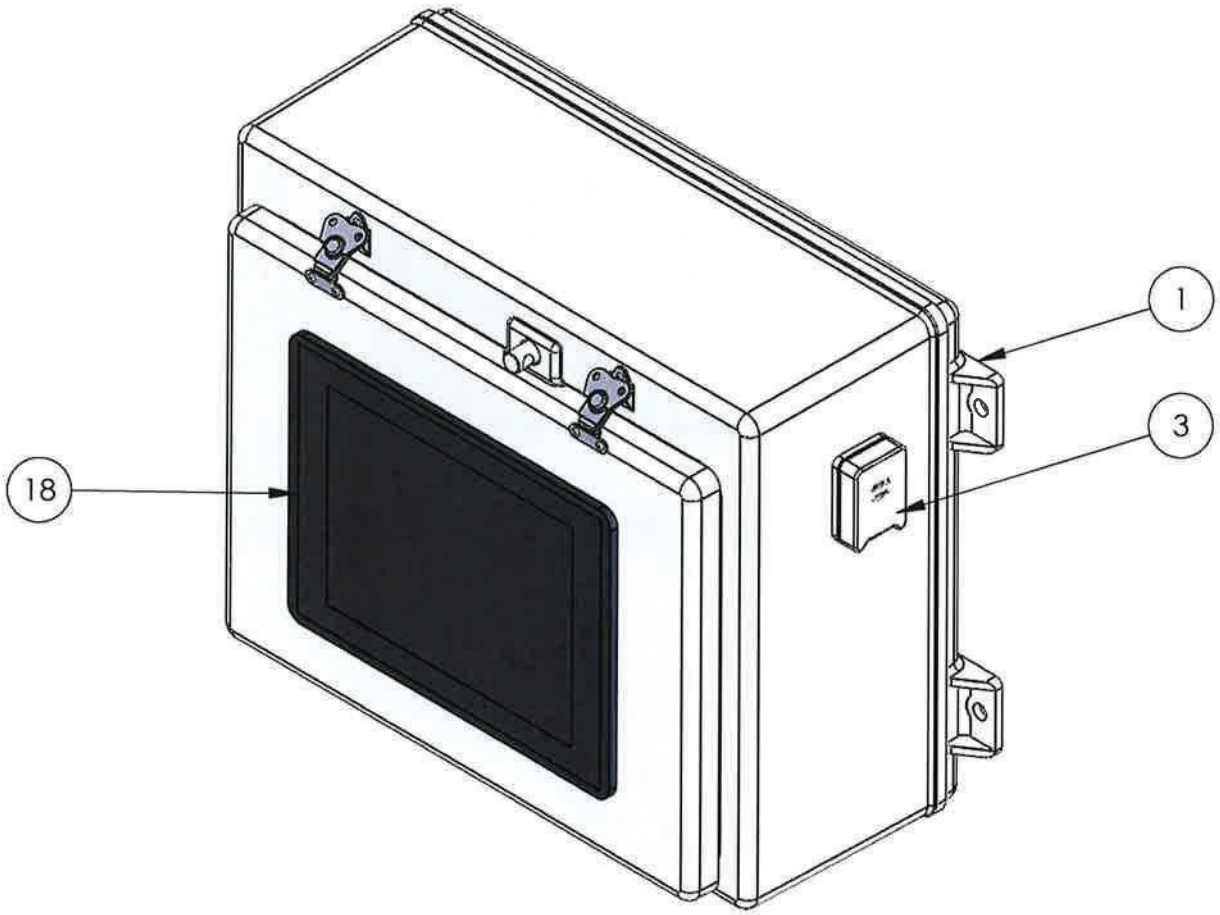
WEIGHT: LB/ KG

SCALE: 1:8 SHEET 1 OF 6

Evaporative Solutions
EVAPOR.COM

420F EVAPORATOR MASTER CONTROL PANEL

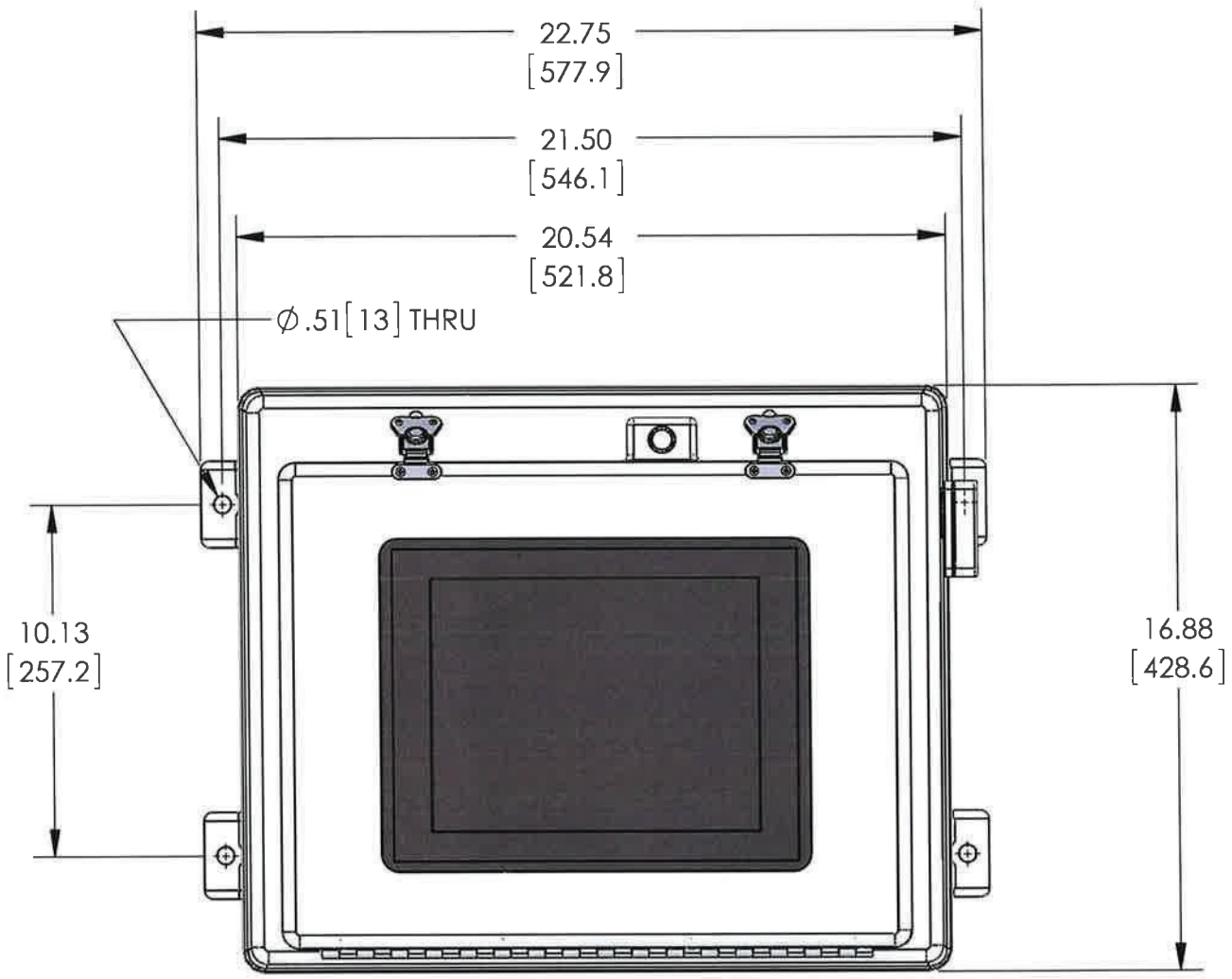
| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 20 | 1 | 06-1766L32BXB | | MICROLOGIX 1400 24VDC PROCESSOR | |
| 21 | 1 | 20-004119 | | 1492 SP1C050 AB 5 AMP 1P C CURVE SUP PROTECTOR | |
| 22 | 1 | 23-004001 | | 1492 JG10 10mm GROUNDING BLOCK | |
| 23 | 2 | 23-004014 | | 1492-J6 AB 6mm BOX LUG BLOCK | |




**420F EVAPORATOR - NO PC CONTROL PANEL - NO TRANSFORMER**

WEIGHT: 133.66 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM

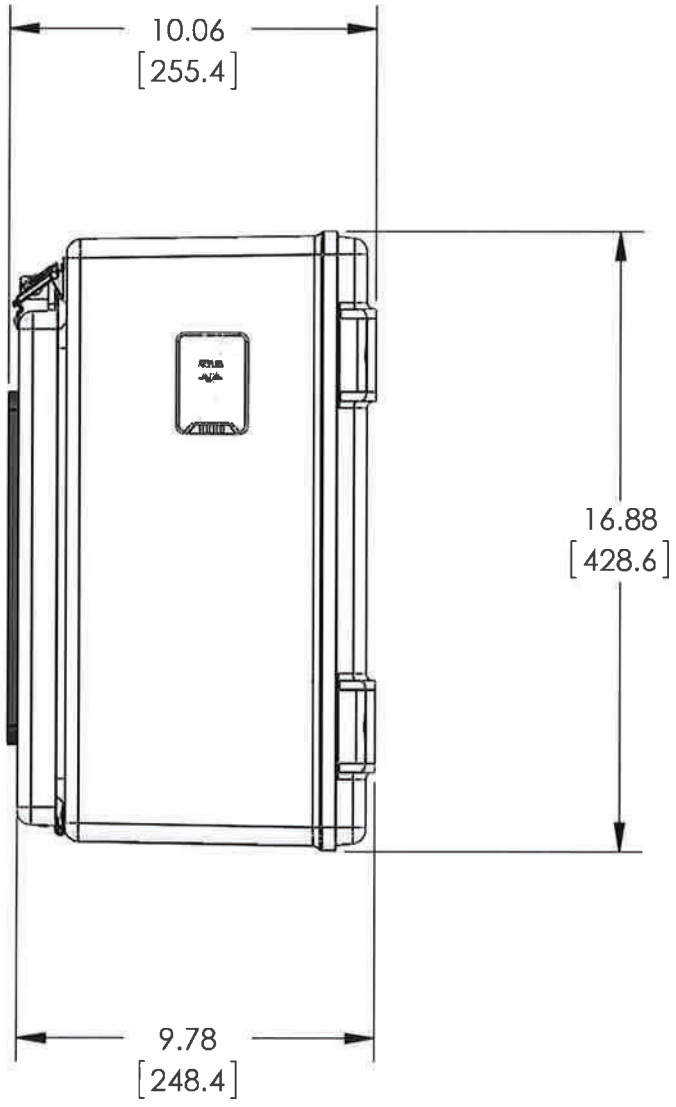



# 420F EVAPORATOR - NO PC CONTROL PANEL - NO TRANSFORMER

WEIGHT: 133.66 LB/ KG

SCALE: 1:5 SHEET 3 OF 6

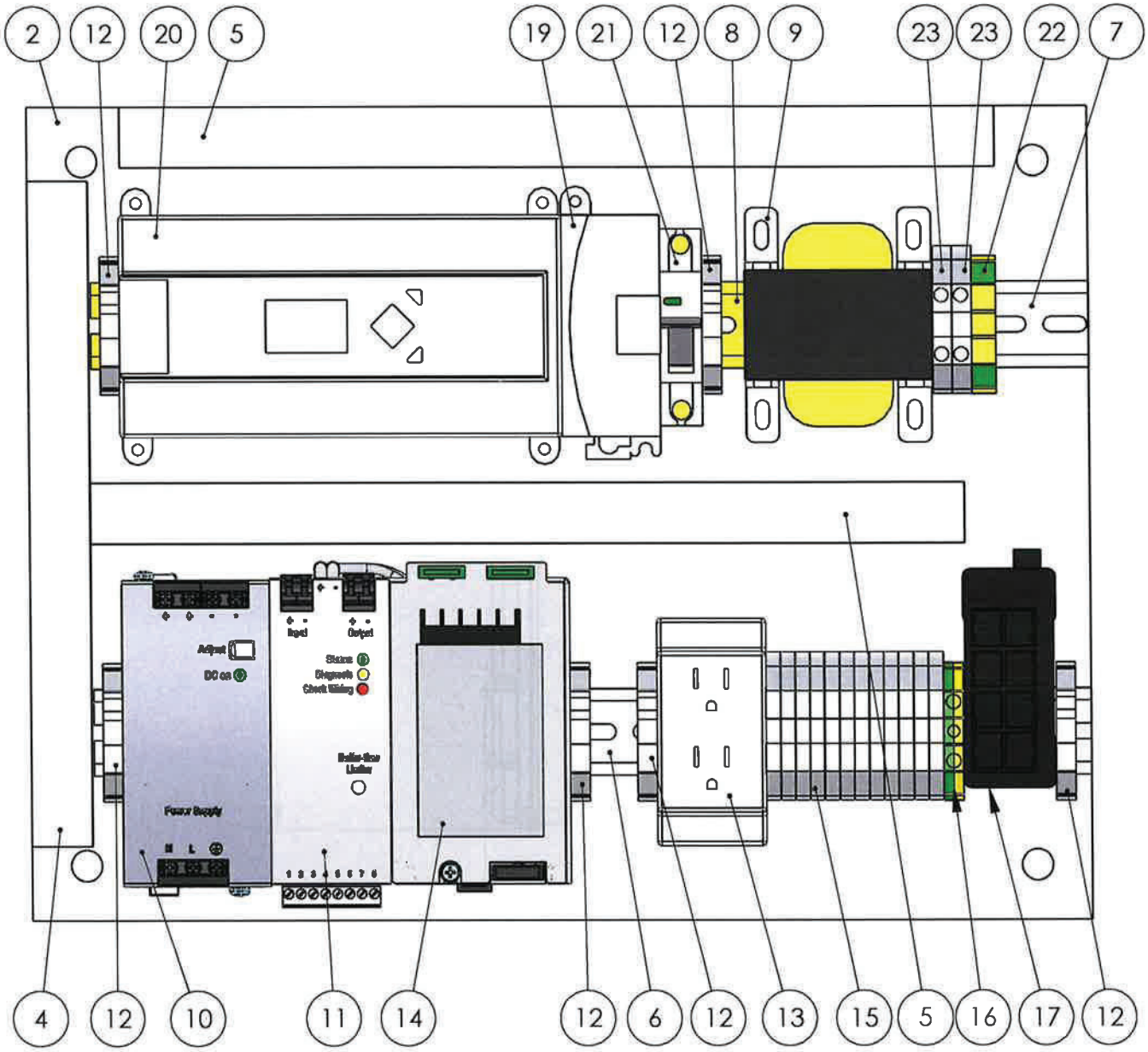
Evaporative Solutions
EVAPOR.COM




# 420F EVAPORATOR - NO PC CONTROL PANEL - NO TRANSFORMER

WEIGHT: 133.66 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM



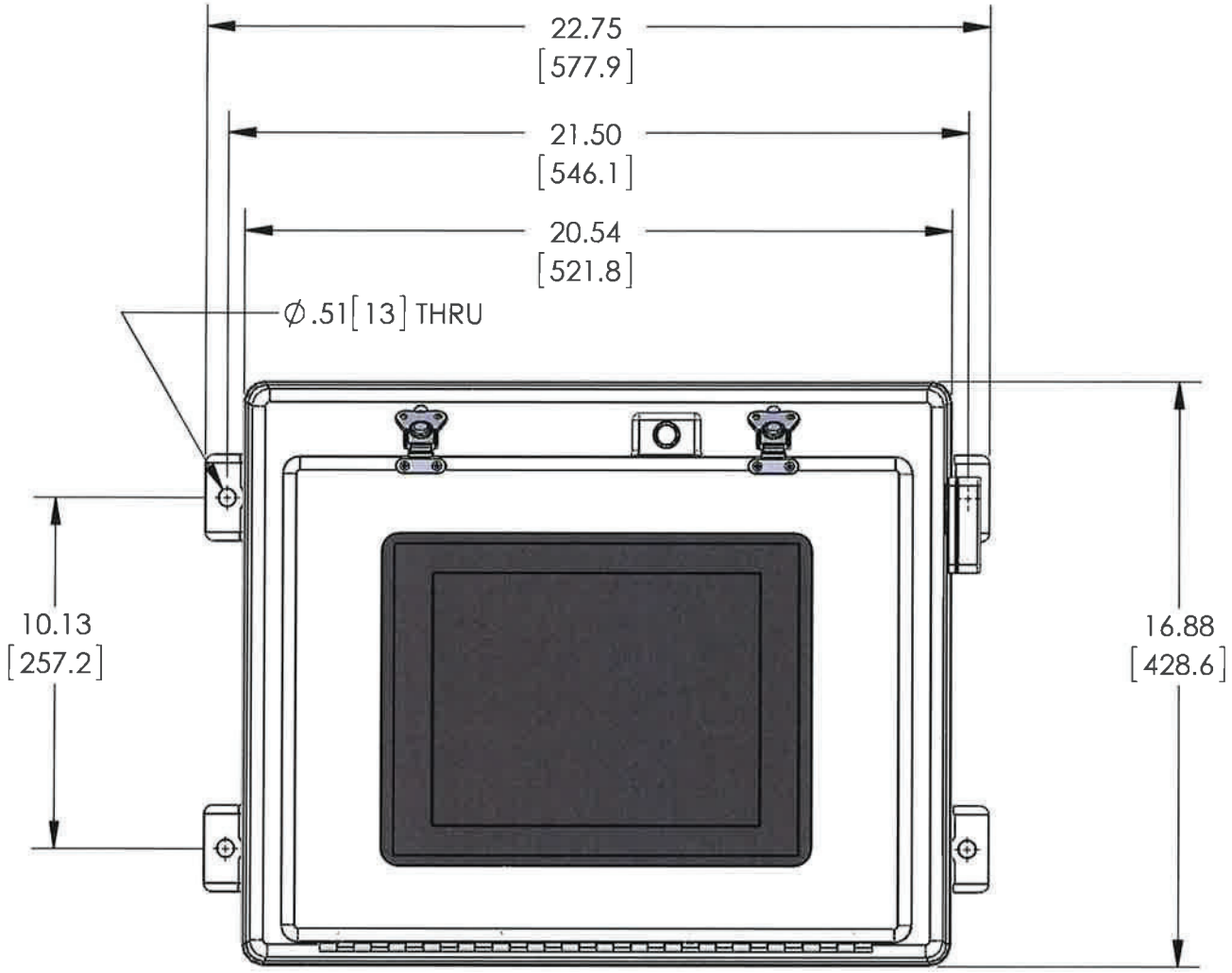

# 420F EVAPORATOR - NO PC CONTROL PANEL - NO TRANSFORMER

WEIGHT: 133.66 LB/ KG

SCALE: 1:2.5 SHEET 5 OF 6



SMI Evaporative Solutions
EVAPOR.COM




## 420F MASTER CONTROL PANEL

WEIGHT: 133.66 LB/ KG

SCALE: 1:5 SHEET 6 OF 6

DOCUMENT NO.: 27-340113.6 REV. LEVEL: REV. DATE:

MACHINE CONTROL PANEL - 420 EVAP

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | 27-N24208-MODx | | STAHLIN NEMA 4X FBGLS ENCLOSURE | |
| 2 | 1 | 27-BP2420CS-MOD | | BP2420CS STAHLIN STEEL BACK PANEL | |
| 3 | 2 | 27-BV4XKIT | | BV4XKIT STAHLIN BREATHER VENT | |
| 4 | 1 | 05-000005 | | DANGER HIGH VOLTAGE DECAL | |
| 5 | 1 | 05-000053 | | ELECTRICAL SHOCK DECAL | |
| 6 | 1 | 05-420001 | | 420 RAINDROP DECAL REFLECTIVE | |
| 7 | 1 | 20-004008 | | 100 C30D 10 AB 20HP CONTACTOR NC | |
| 8 | 1 | 20-004018 | | 194E-A80-1753-6N 80 AMP LOADBREAK SWITCH | |
| 9 | 1 | 20-004040 | | 140M F8E C45 AB 32-45 AMP CIRCUT PROTECTOR | |
| 10 | 1 | 20-004119 | | 1492 SP1C050 AB 5 AMP 1P C CURVE SUP PROTECTOR | |
| 11 | 1 | 20-200999 | | 800FX01 ADD-ON CONTACT BLOCK | |
| 12 | 1 | 20-201000 | | 800FX10 ADD-ON CONTACT BLOCK NO | |
| 13 | 1 | 20-201001 | | 800F-ALP MOUNTING BASE FOR BLOCKS AB | |
| 14 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 15 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 16 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 17 | 1 | 23-199DR1 | | 35mm DIN RAIL | |
| 18 | 1 | 23-1291162 | | MC25X62WH2 WIRING DUCT | |
| 19 | 1 | 23-1291162 | | MC25X62WH2 WIRING DUCT | |

WEIGHT: LB/ KG

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SCALE: 1:8 SHEET 1 OF 9

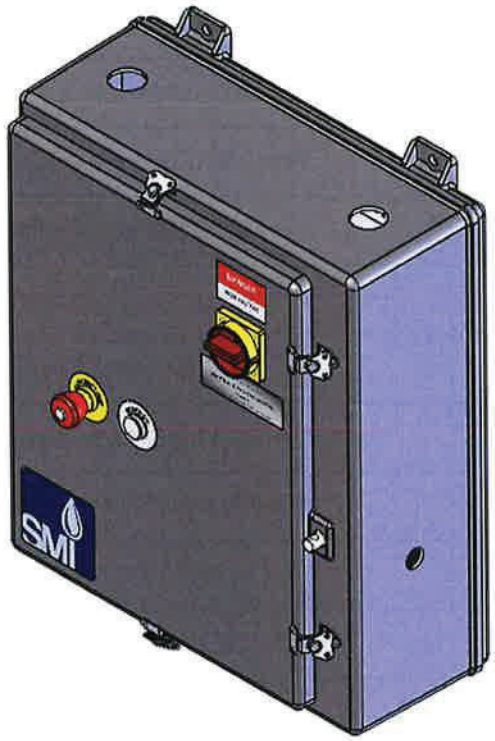
MACHINE CONTROL PANEL - 420 EVAP

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 20 | 1 | 23-1291162 | | MC25X62WH2 WIRING DUCT | |
| 21 | 1 | 23-1291166 | | MC25X37WH2 WIRING DUCT | |
| 22 | 1 | 23-1291167 | | MC25X75WH2 WIRING DUCT | |
| 23 | 1 | 20-201041 | | 800FP-LMT44 E-STOP BUTTON | |
| 24 | 1 | 20-201032 | | 800F-N5R RED LED 120V LIGHT MODULE | |
| 25 | 1 | 20-800F15YSE112 | | 800F-15YSE112 E-STOP LEGEND PLATE | |
| 26 | 1 | 20-P60BLWSADH12 | | P60BLWSADH122 POWER ON LEGEND | |
| 27 | 1 | 20-201030 | | 800FP-P7PN5W AB WHITE LED | |
| 28 | 2 | 23-004001 | | 1492 JG10 10mm GROUNDING BLOCK | |
| 29 | 1 | 20-004117 | | 1492-SP2C010 1 AMP 2P BREAKER | |
| 30 | 1 | 20-004062 | | 700-FEY2QU23 AB TIMER Y-DELTA | |
| 31 | 1 | 20-ML60.241 | | ML60.241 PULS 24VDC 60W PS | |
| 32 | 1 | 26-000122 | | 110VA 415/440/480-120V 50/60HZ TRANSFORMER | |
| 33 | 1 | 06-1763L16BWA | | 1763L16BWA MICROLOGIX 1100 PROCESSOR | |
| 34 | 1 | 20-004026 | | 140M-C2E-B63 4.0-6.3A MOTOR PROTECTOR | |
| 35 | 1 | 20-004009 | | 100-C30D01 AB 20 HP CONTACTOR NC | |
| 36 | 1 | 20-004012 | | 100-C23D01 120V NC AB CONTACTOR | |
| 37 | 4 | 23-004010 | | 1492-ERL35 AB END ANCHOR | |
| 38 | 1 | 20-V1K12A00 | | V1K12A00 VFD OUTPUT FILTER | |

WEIGHT: LB/ KG

MACHINE CONTROL PANEL - 420 EVAP

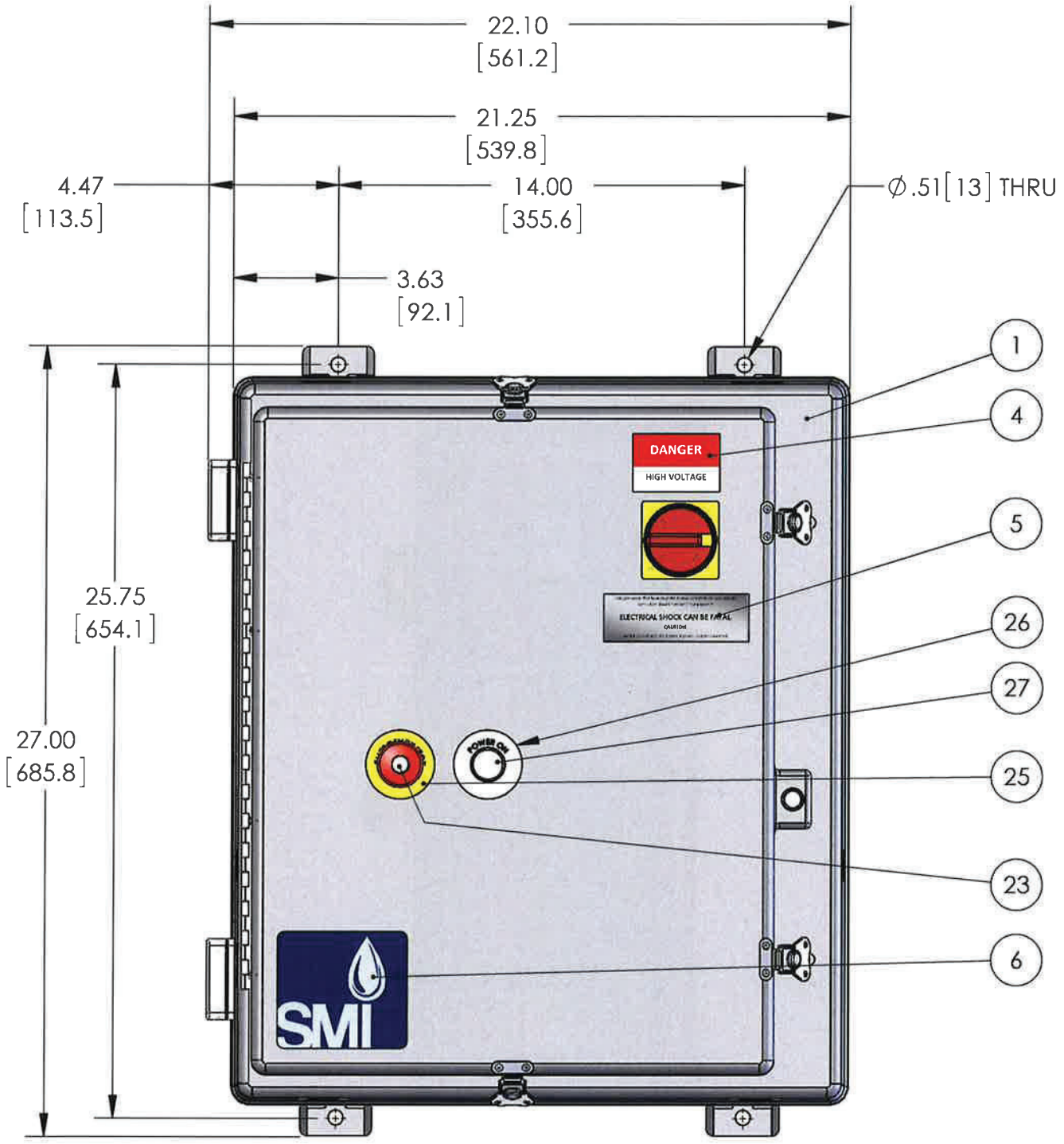
| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 39 | 1 | 20-104TX | | 104TX N-TRON ETHERNET SWITCH | |
| 40 | 14 | 23-004005 | | 1492-J4 AB 4mm BOX LUG BLOCK | |
| 41 | 1 | 20-25B-D6P0N104 | | 25B-D6P0N104 VFD 380-480V 6 AMP | |




## 420 EVAP - AUTO 25HP/2HP VFD PANEL

WEIGHT: 189.09 LB/ KG

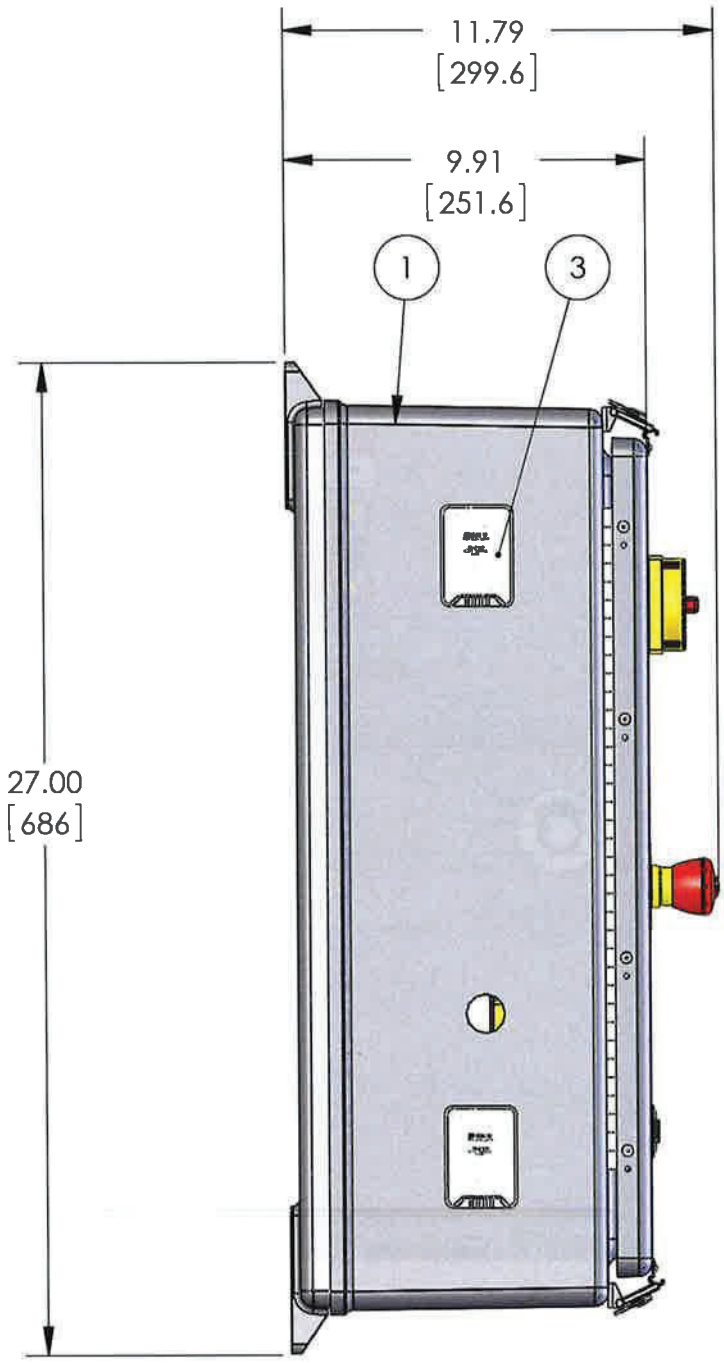
SMI Evaporative Solutions
EVAPOR.COM




## 420 EVAP - AUTO 25HP/2HP VFD PANEL

WEIGHT: 189.09 LB/ KG

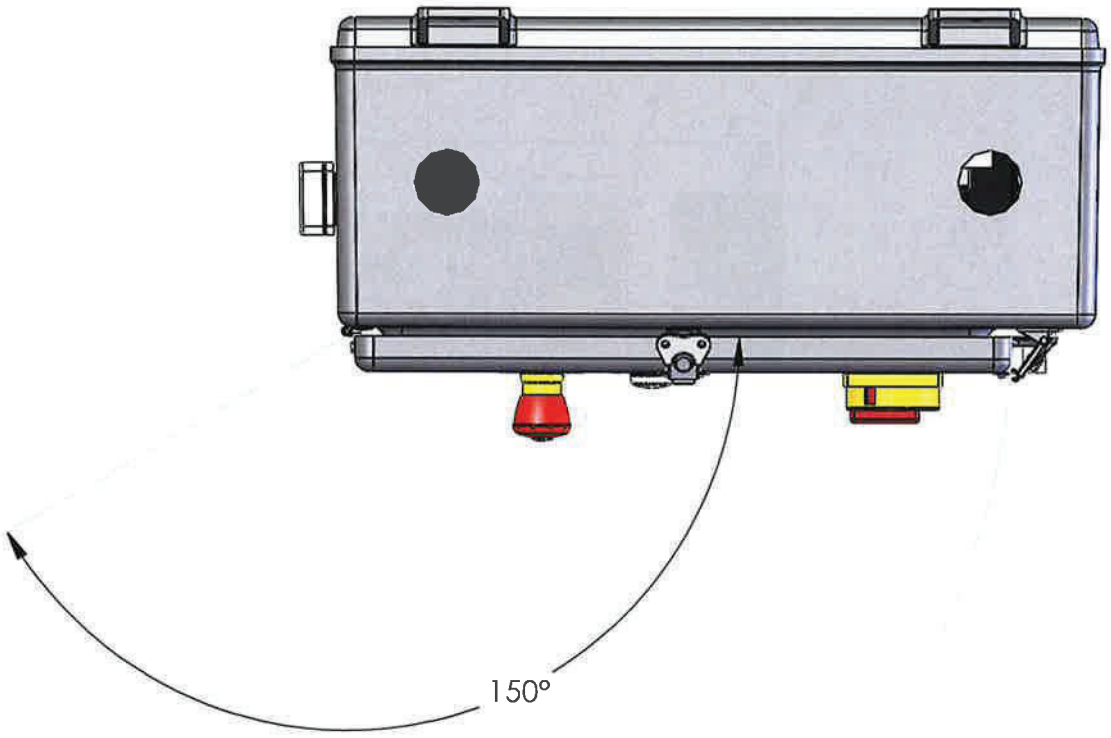
SMI Evaporative Solutions
EVAPOR.COM




# 420 EVAP - AUTO 25HP/2HP VFD PANEL

WEIGHT: 189.09 LB/ KG

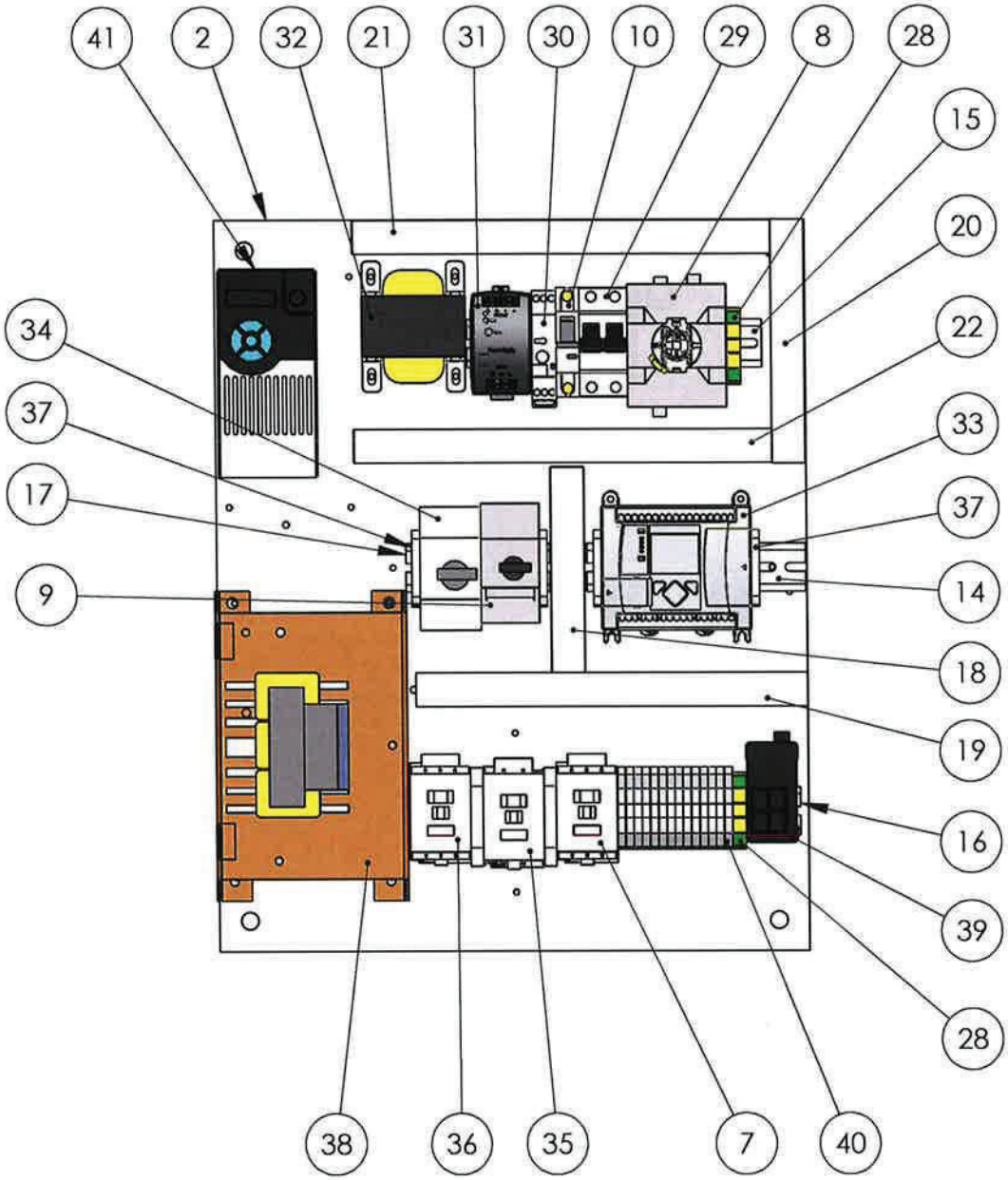
SCALE: 1:5 SHEET 5 OF 9




## 420 EVAP - AUTO 25HP/2HP VFD PANEL

WEIGHT: 189.09 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM

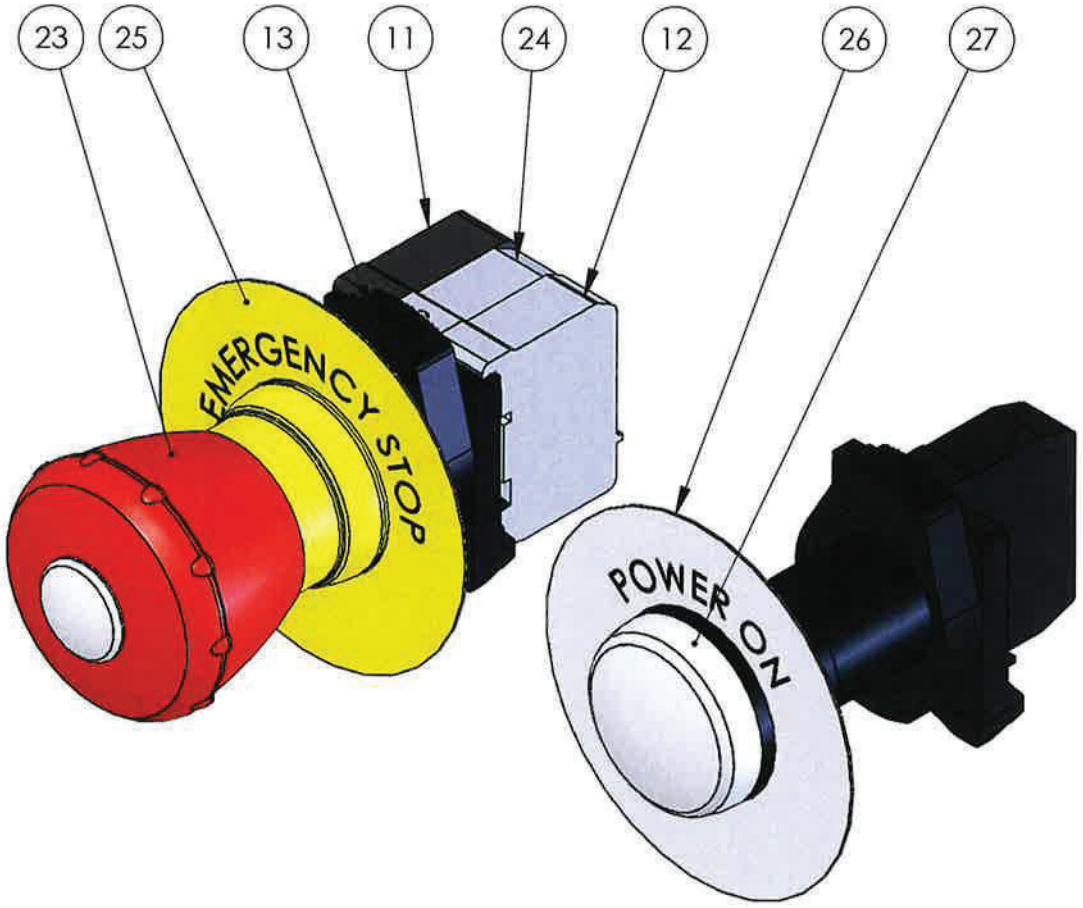



## 420 EVAP - AUTO 25HP/2HP VFD PANEL

WEIGHT: 189.09 LB/ KG



Evaporative Solutions
EVAPOR.COM

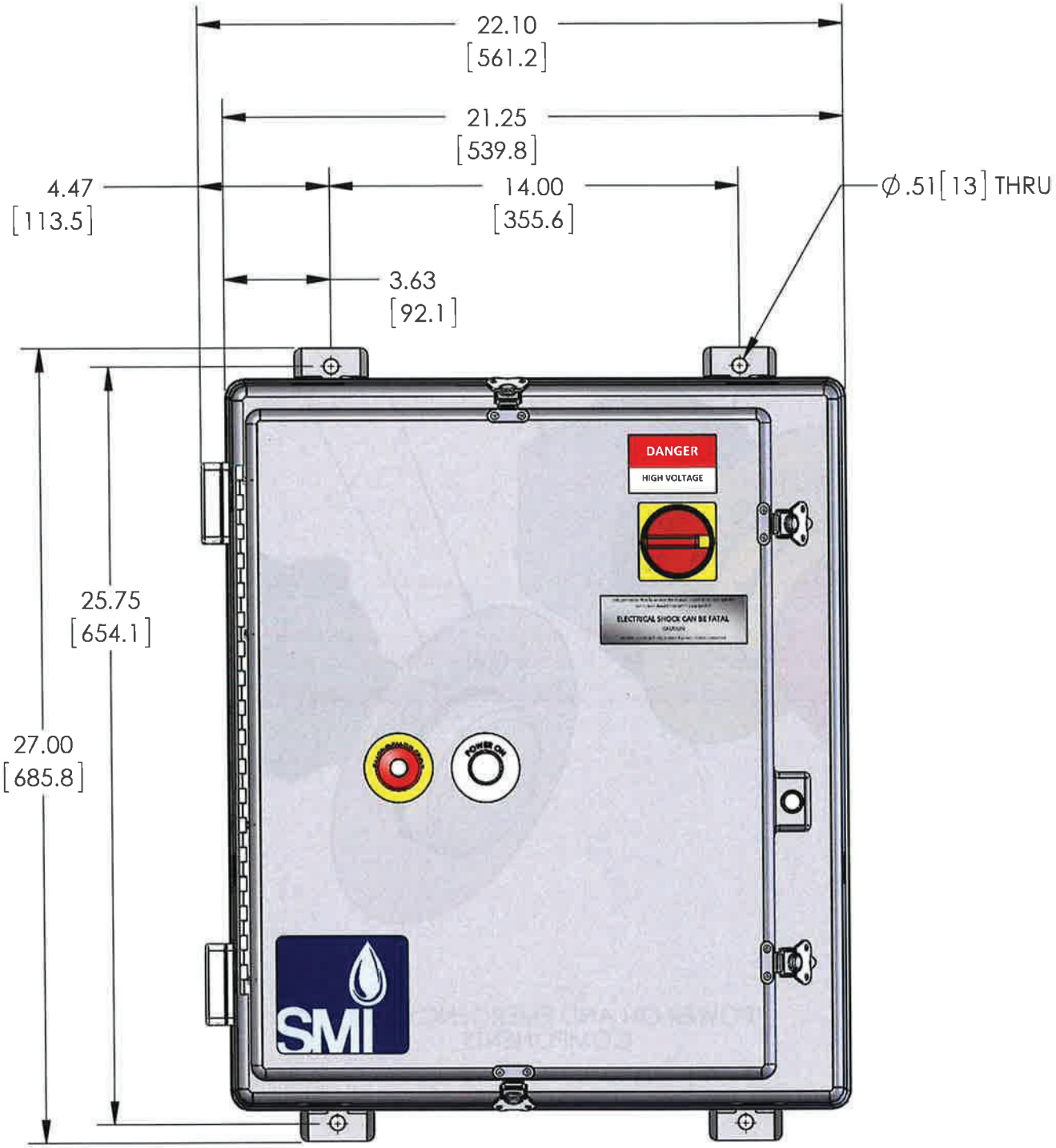



POWER ON AND EMERGENCY STOP
COMPONENTS

## 420 EVAP - AUTO 25HP/2HP VFD PANEL

WEIGHT: 189.09 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM




## 420 EVAP - AUTO 25HP/2HP VFD PANEL

WEIGHT: 189.09 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM

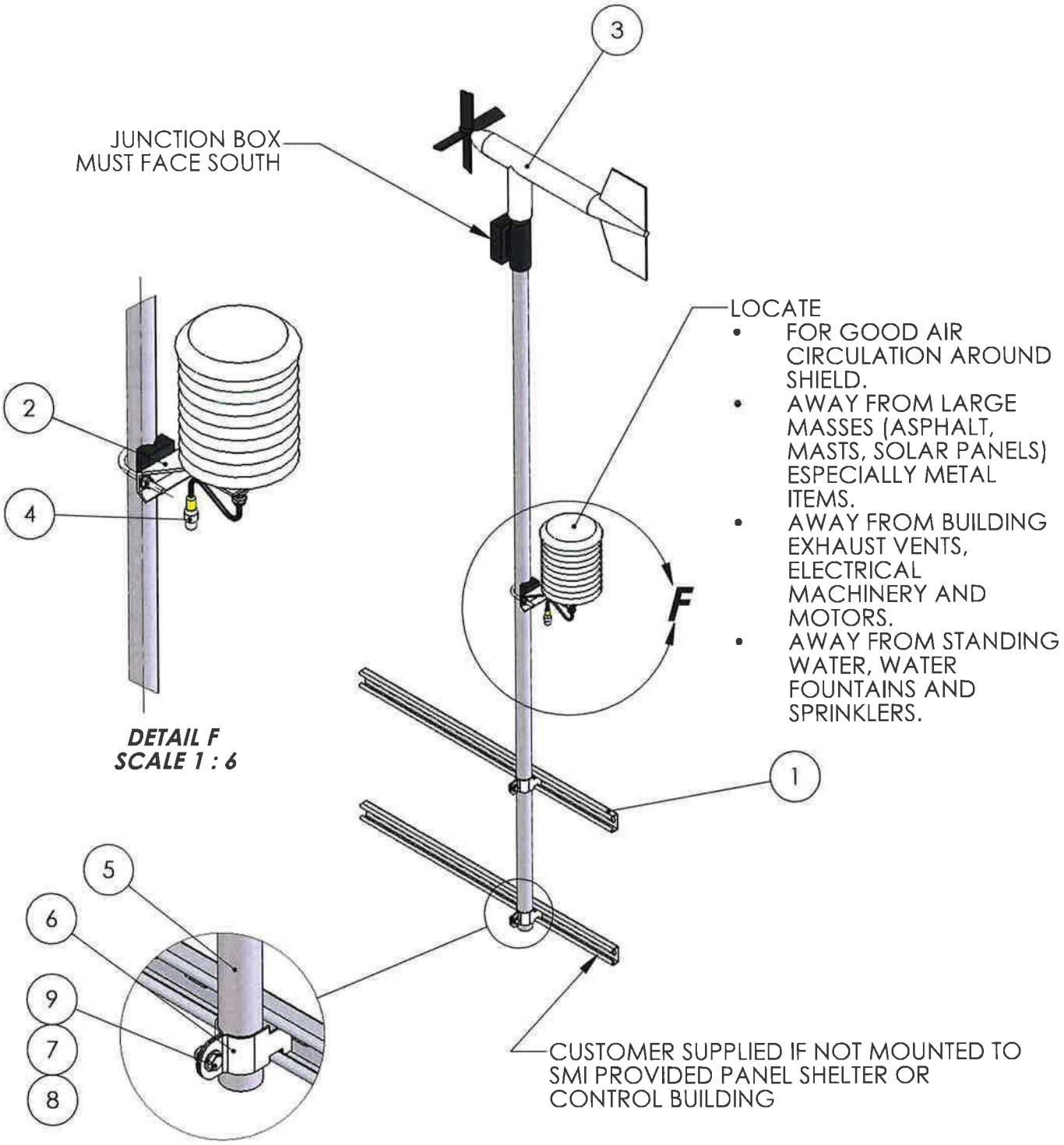
WIND, TEMPERATURE & HUMIDITY COMPONENTS

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 2 | *MISC ELECTRICAL | | 1-5/8" X 13/16" P4100 UNISTRUT (OR EQUIVALENT) TO SUIT | |
| 2 | 1 | 06-41003P | | 41003-P RADIATION SHIELD | |
| 3 | 1 | 06-05103LP | | 05103LP WIND MONITOR | |
| 4 | 1 | 06-KPC3/9-G17-1 | | GALLTEC HUMIDITY/TEMPERATURE SENSOR | |
| 5 | 6 | 40-020010 | | 1-1/4ODx.120w TUBEUNPIC/UNANL (FT) | |
| 6 | 4 | *MISC ELECTRICAL | | #703-1 SUPER STRUT PIPE CLAMP (1.163 - 1.315 OD) | |
| 7 | 4 | .25 Nom ID | | SS FLAT WASHER | |
| 8 | 2 | 1/4-20 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 9 | 2 | 1/4-20 x 5/8" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 10 | 1 | 06-RK4.4T-3S653 | | 10' (3m) SENSOR CORD W/ RECEPTACLE | |
| | | 06-RK4.4T-16S65 | | 52' (16m) SENSOR CORD W/RECEPTACLE | |
| | | 06-RK4.4T-7S65 | | 23' (7m) SENSOR CORD W/RECEPTACLE | |

ITEM #10 NOT SHOWN IN ASSEMBLY. PLUG END CONNECTS TO ITEM#4. LENGTH REQUIRED DETERMINED BY MOUNTING TYPE AND LOCATION.

WEIGHT: LB/ KG

SCALE: 1:32 SHEET 1 OF 2




# WIND, TEMPERATURE, AND HUMIDITY SENSORS

WEIGHT: 41.02 LB/ KG

SCALE: 1:12 SHEET 2 OF 2

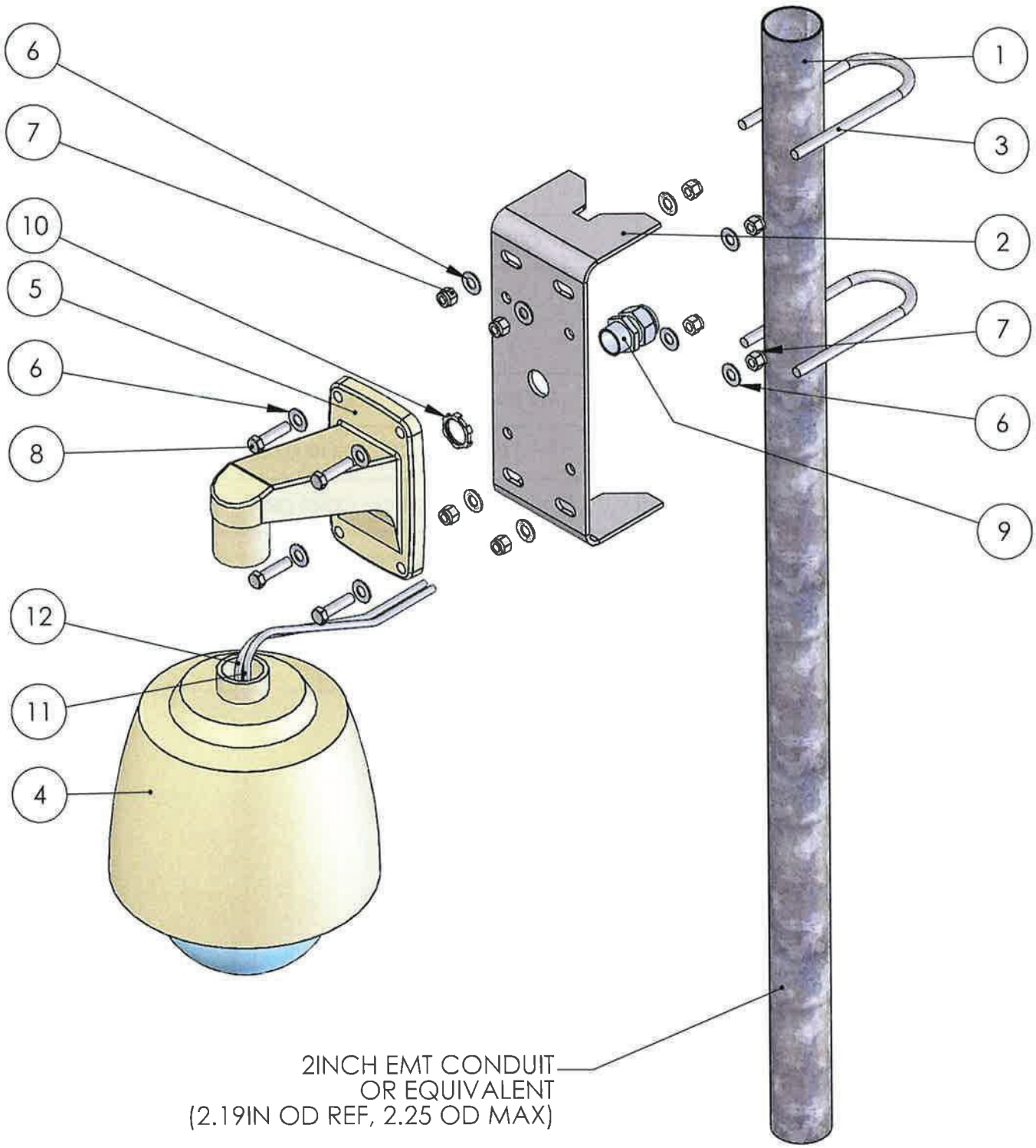
# 420 FLOAT FRAME COMPONENTS

| ITEM NO. | QTY. | PART NUMBER | Rev | DESCRIPTION | INITIALS |
|---|---|---|---|---|---|
| 1 | 1 | *MISC ELECTRICAL | | 2" EMT CONDUIT | |
| 2 | 1 | 06-PTZ SMI PTZ | | CAMERA MOUNTING BRACKET | |
| 3 | 2 | 06-PTZ U BOLT | | CAMERA MOUNT U-BOLT | |
| 4 | 1 | 06-PTZCAMERA | | OUTDOOR DOME PTZ NETWORK CAMERA | |
| 5 | 1 | 06-PTZBRACKET | | PTZ NETWORK CAMERA BRACKET | |
| 6 | 12 | .38 Nom ID | | SS FLAT WASHER | |
| 7 | 8 | 3/8-16 THD | | HEX LOCK NUT, STAINLESS STEEL NYLON INSERT | |
| 8 | 4 | 3/8-16 x 1-1/2" LG | | STAINLESS STEEL HEX HEAD SCREW | |
| 9 | 1 | *MISC ELECTRICAL | | 3/4" 2-HOLE CORD GRIP | |
| 10 | 1 | 22-008001 | | 3/4" CONDUIT LOCKNUT | |
| 11 | 1 | 25-AUTO39 | | 18/2 TYPE AWM AUTO STROBE LIGHT CORD (FT) | |
| 12 | 1 | *MISC ELECTRICAL | | CAT5 CABLE | |

**POST MOUNTED OUTDOOR VIDEO CAMERA**

WEIGHT: 54.93 LB/ KG

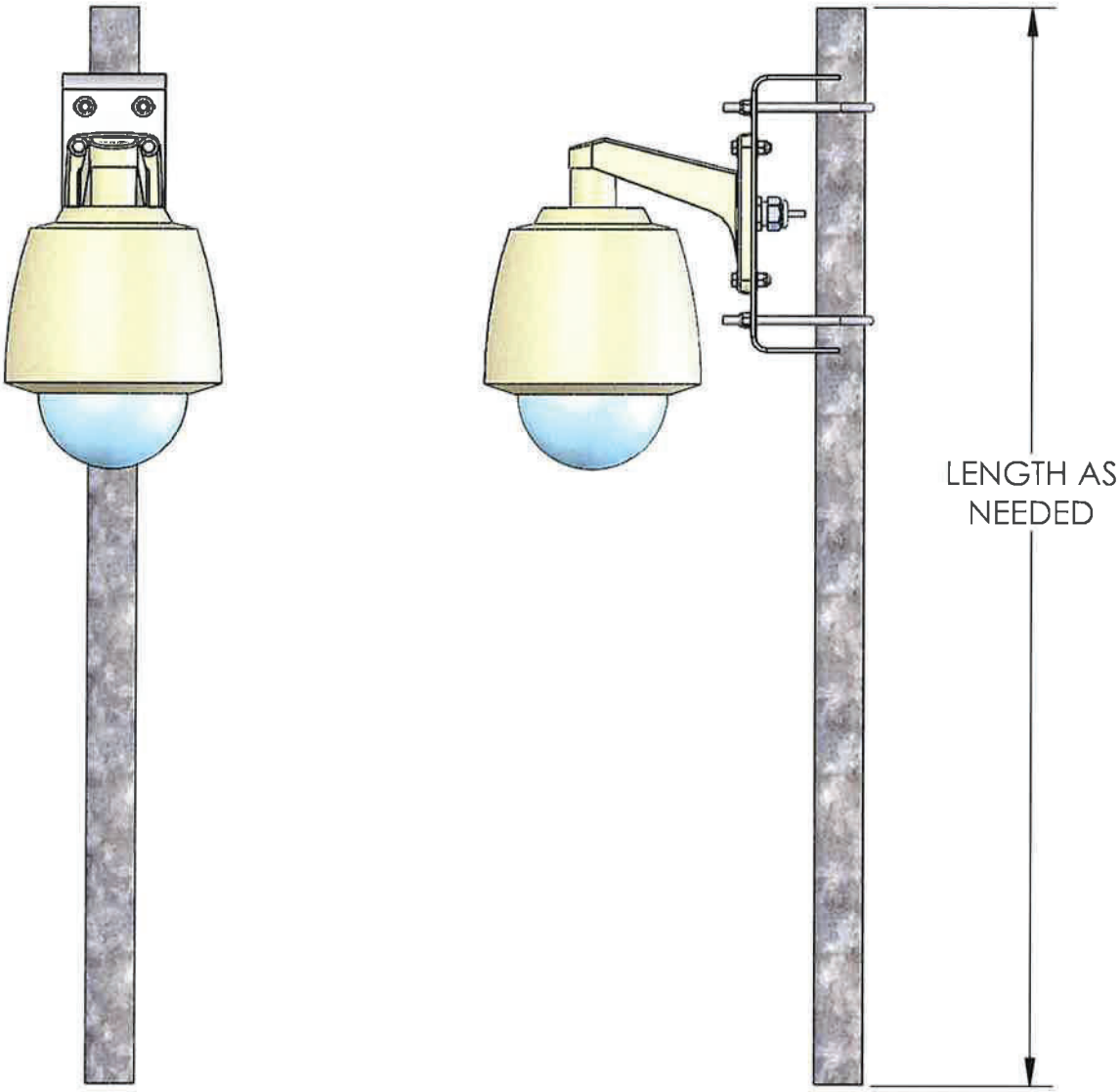
SMI Evaporative Solutions
EVAPOR.COM




**POST MOUNTED OUTDOOR VIDEO CAMERA**

WEIGHT: 54.93 LB/ KG

SCALE: 1:5 SHEET 2 OF 3




# POST MOUNTED OUTDOOR VIDEO CAMERA

WEIGHT: 54.93 LB/ KG

SMI Evaporative Solutions
EVAPOR.COM

# ATTACHMENT 3

LANL NPDES Permit No. NM0028355, Notice of Planned Change to Outfall 03A160

EPC-DO: 19-302

LA-UR-19-28341

Date: AUG 2 0 2019

Los Alamos
NATIONAL LABORATORY
EST. 1943

***Environmental Protection & Compliance Division***
***Compliance Programs Group***
Los Alamos National Laboratory
PO Box 1663, K490
Los Alamos, NM 87545
505-667-0666

*Symbol:* EPC-DO: 19-194
*LAUR:* 19-25343
*Date:* JUN 1 2 2019

Ms. Nancy Williams
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**Subject: Los Alamos National Laboratory, National Pollutant Discharge Elimination System, Permit No. NM0028355, Notice of Planned Change to Outfall 03A160**

Dear Ms. Williams:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the Nuclear Security Administration (NNSA) and Triad National Security, LLC (Triad) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) of any physical alterations or additions to a permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. Report Requirements).

This notice of change is for the addition of a cooling tower water treatment system at the TA-35 National High Magnetic Field Laboratory (NHMFL) Cooling Towers that will start operations in July 2019. The new water treatment system will add corrosion inhibitor and biocide to the towers automatically using a programmable logic controller monitoring system. This will increase the efficiency of the cooling towers and provide cooling tower water treatment that is similar to the other cooling towers at the Laboratory. Attachment 1 provides a revised process schematic and water balance. Table 1 provides a revised list of wastewater treatment codes for the outfall.

**Table 1**
**Wastewater Treatment Codes Assigned to Outfall 03A160**

| Source | Treatment Code | Description | Justification |
|---|---|---|---|
| | 2-E | Dechlorination | Chlorine Scavenger Chemicals are Added |
| | 2-H | Disinfection (other) | Chemicals are added to Control Microorganisms |

| | | | |
|---|---|---|---|
| NHMFL Cooling Towers | 2-L | Reduction | Chemicals that are Antiscalant and Corrosion Inhibitors are Added |

Table 2 provides a revised list of treatment chemicals for the cooling towers and Attachment 2 provides a copy of the associated Safety Data Sheets.

**Table 2**
**List of New and/or Proposed Treatment Chemicals for Future Operations at Outfall 03A160**

| Chemical Name | Reason for Use | Toxic Pollutant and/or Hazardous Substances Table 2C-3 or 2C-4 | |
|---|---|---|---|
| GC Formula 2011 LT | Corrosion Inhibitor | phosphonobutane | NA |
| | | tricarboxylic acid | NA |
| | | monosodium phosphate | NA |
| | | benzotriazole | NA |
| | | phosphinocarboxylic acid | NA |
| GC Formula 314-T | Biocide | 1-bromo-3-chloro-5,5-dimethyl hydantoin (chlorine source) | 2C-4 |
| GC Formula 315 | Biocide | 5-chloro-2-methyl-4-isothiazolin-3-one (chlorine source) | 2C-4 |
| | | 2-methyl-4-isothiazolin-3-one | NA |
| | | magnesium nitrate | NA |
| | | magnesium chloride | NA |
| WEST R-630 | Dechlorination | Sodium Bisulfite | 2C-4 |

This change does not immediately impact Outfall 03A160 because the tower routinely discharges to the TA-46 Sanitary Waste Water System. The modification does potentially change the effluent water quality if the towers discharge blowdown directly to Outfall 03A160. Therefore this notification is provided to the EPA as supplemental information to the 2019 NPDES Permit Application submitted to the EPA in March 2019.

Please contact Jennifer Griffin at (505) 667-6741 or Michael T. Saladen at (505) 665-6085 of the Environmental Compliance Programs Group (EPC-CP) if you have questions.

Sincerely,

Taunia S. Van Valkenburg
Group Leader

TVV/MTS/JKG:jdm

Attachment(s): Attachment 1 NPDES-FD-18-011-R1, Future Process Schematic TA-35 NHMFL Cooling Towers
Attachment 2 Safety Data Sheets

Copy: Sarah Holcomb, NMED/SWQB, sarah.Holcomb@state.nm.us (Hard copy, E-File)
Shelly Lemon, NMED/SWQB, Shelly.Lemon@state.nm.us (E-File)
Erin Shea, NMED/SWQB, erin.shea@state.nm.us (E-File)
Michelle Hunter, NMED/GWQB, michelle.hunter@state.nm.us (E-File)
Karen E. Armijo, NA-LA, Karen.armijo@nnsa.doe.gov (E-File)
Michael W. Hazen, mhazen@lanl.gov (E-File)
William R. Mairson, wmarison@lanl.gov (E-File)
Enrique Torres, EPC-DO, etorres@lanl.gov (E-File)
Taunia S. Van Valkenburg, EPC-CP, tauniav@lanl.gov (E-File)
Michael T. Saladen, EPC-CP, saladen@lanl.gov (E-File)
Jennifer Griffin, EPC-CP, jkg@lanl.gov, (E-File)
Brian Watkins, WFO-DO, bwatkins@lanl.gov, (E-File)
Robert Stokes, DESH-WFO, rstokes@lanl.gov, (E-File)
Darren Hanson, J-8, dhanson@lanl.gov, (E-File)
Kelkenny Bileen, DESH-WFO, kbileen@lanl.gov, (E-File)
Jesse R. Bailon, J-8, jesseb@lanl.gov, (E-File)
epc-correspondence@lanl.gov, (E-File)
adesh-records@lanl.gov, (E-File)

# ATTACHMENT 1

NPDES-FD-18-011-R1, Future Process Schematic TA-35
NHMFL Cooling Towers

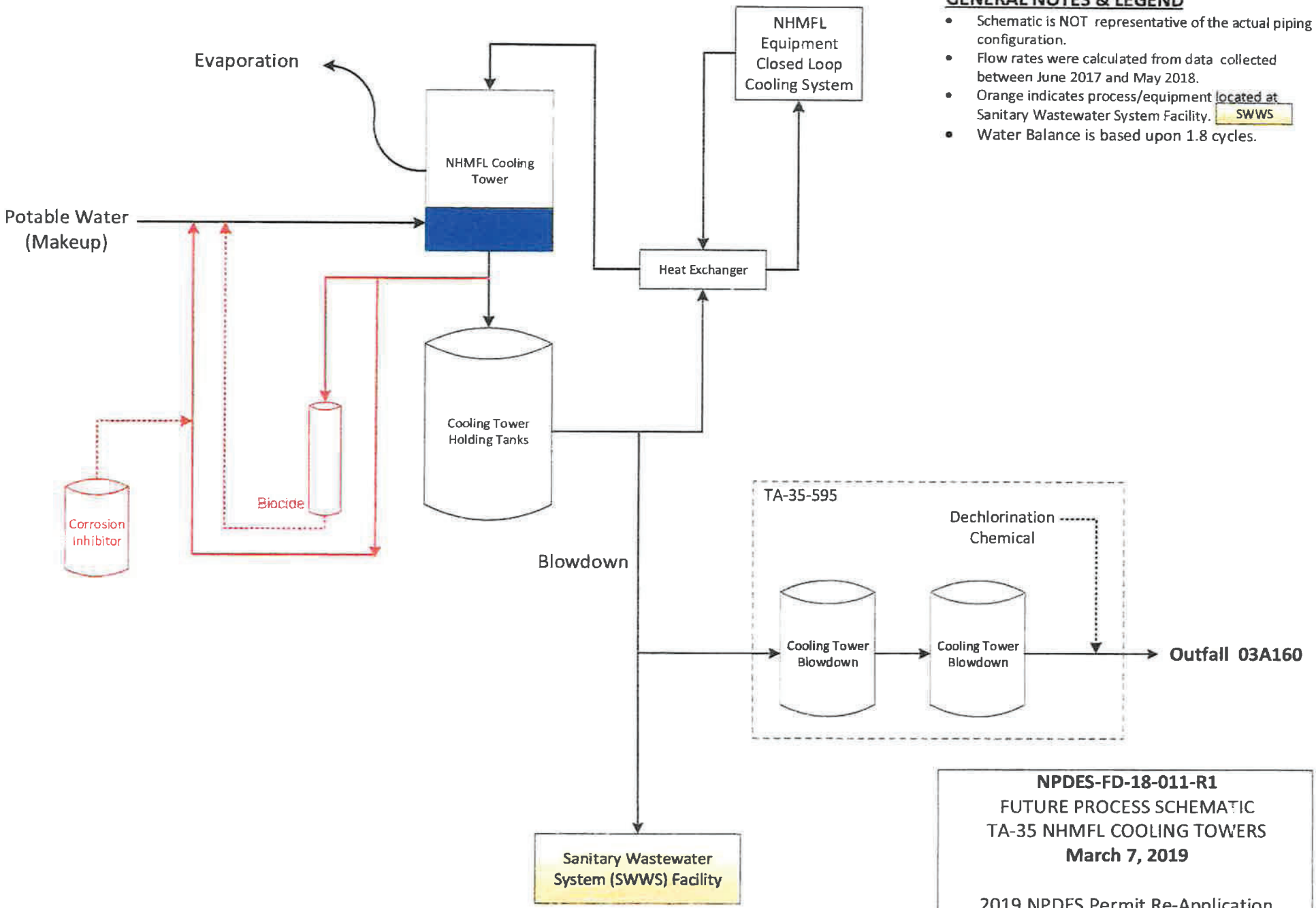
EPC-DO: 19-194

LA-UR-19-25343

Date: JUN 1 2 2019

## GENERAL NOTES & LEGEND

- Schematic is NOT representative of the actual piping configuration.
- Flow rates were calculated from data collected between June 2017 and May 2018.
- Orange indicates process/equipment located at Sanitary Wastewater System Facility. SWWS
- Water Balance is based upon 1.8 cycles.




**NPDES-FD-18-011-R1**
FUTURE PROCESS SCHEMATIC
TA-35 NHMFL COOLING TOWERS
**March 7, 2019**

2019 NPDES Permit Re-Application
OUTFALL 03A160

# ATTACHMENT 2

Safety Data Sheets

EPC-DO: 19-194

LA-UR-19-25343

Date: JUN 1 2 2019

# FORMULA 2011

Garratt CALLAHAN

# MATERIAL SAFETY DATA SHEET

*Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Directives*

## SECTION 1 - PRODUCT IDENTIFICATION

| | |
|---|---|
| Product Name: | FORMULA 2011 |
| Product Use: | COOLING WATER TREATMENT |
| UN NUMBER: | Not applicable |
| U.N. DANGEROUS GOOD CLASS/SUBSIDIARY RISK: | Not applicable |
| MANUFACTURER'S NAME: | Garratt-Callahan Company |
| ADDRESS: | 50 Ingold Road, Burlingame, CA 94010-2206 |
| EMERGENCY PHONE: | **North America: CHEMTREC: 1-800-424-9300**<br>**Outside North America: +1-703-527-3887** |
| BUSINESS PHONE: | Product Information: 650-697-5811 |
| MSDS Number: | SD2011 |
| DATE OF REVISION: | 2/22/2011 |

## SECTION 2 - HAZARDS IDENTIFICATION

EU LABELING AND CLASSIFICATION: Components of this product have not been classified as defined by the European Economic Community Guidelines (EECC). This product has not been classified by the EECC.

EU CLASSIFICATION: Not classified.

EU RISK PHRASES: Not classified.

EU SAFETY PHRASES: Not classified.

**DANGER! THIS PRODUCT IS A NON-FLAMMABLE, CLEAR LIGHT YELLOW LIQUID WITH SLIGHT ORGANIC ODOR. MAY CAUSE EYE AND SKIN IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION.**

HEALTH EFFECTS AND RISKS FROM EXPOSURE:
ACUTE: Contact with skin and eyes will cause burning and irritation. Do not wear contact lenses when using this product. Ingestion will cause gastric distress and possible depression of the central nervous system.
CHRONIC: Repeated or prolonged exposure to this product can produce target organ damage. Repeated exposure of the eyes can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation can produce varying degrees of respiratory irritation or lung damage.
TARGET ORGANS:
ACUTE: Skin, eyes, respiratory system.
CHRONIC: Skin, respiratory system

**HAZARDOUS MATERIAL IDENTIFICATION SYSTEM**

| | |
|---|---|
| HEALTH HAZARD (BLUE) | 1 |
| FLAMMABILITY HAZARD (RED) | 0 |
| REACTIVITY HAZARD (YELLOW) | 0 |

Hazard Scale
0=Minimal
1=Slight
2=Moderate
3=Serious
4=Severe
*=Chronic hazard

## SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

| Hazardous Ingredients | CAS# | HAZARDOUS | EC# | ICSC# | WT % | Classification: Risk Phrases |
|---|---|---|---|---|---|---|
| PHOSPHONOBUTANE TRICARBOXYLIC ACID | 37971-36-1 | YES | 253-733-5 | NE | < 5 | Not classified |
| MONOSODIUM PHOSPHATE | 7558-80-7 | YES | 231-449-2 | NE | < 5 | Not classified |
| BENZOTRIAZOLE | 95-14-7 | YES | 202-394-1 | 1091 | < 3 | Not classified |
| PHOSPHINOCARBOXYLIC ACID | 71050-62-9 | YES | NE | NE | 1 | Not classified |

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard JIS Z 7250: 2000. See Section 2 for full text of Risk Phrases and Safety Phrases.

## SECTION 4 - FIRST AID MEASURES

Exposed individuals must be taken for medical attention if any adverse effect occurs. Take a copy of this MSDS to the health professional with the individual.

SKIN EXPOSURE: If this product contaminates the skin, begin decontamination with running water and soap. Minimum flushing time is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate the eyes. The exposed individual must seek medical attention if any adverse effect occurs.

EYE EXPOSURE: If vapors, mists, or sprays are generated by this product and enter the eyes, open the exposed individual's eyes while under gently running water. Use sufficient force to open the cyclids. Have the exposed individual "roll" their eyes. Minimum flushing time is for 15 minutes. The exposed individual must seek immediate medical attention.

INHALATION: If vapors, mists, or sprays generated by this product are inhaled, remove exposed individual to fresh air. Remove or cover gross contamination to avoid exposure to rescuers.

INGESTION: Routine use of this product is not expected to cause any situation which could lead to ingestion. If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT ASSISTANCE INFORMATION. Exposed individual must seek immediate medical attention. Never induce vomiting or give diluents (milk or water) by mouth to someone who is unconscious, having convulsions, or unable to swallow.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin and respiratory disorders, as well as conditions involving the "Target Organs" (see Section 2, Hazard Identification) which may be aggravated by prolonged exposures to this product. Exposed individual must seek immediate medical attention if any adverse effect occurs.

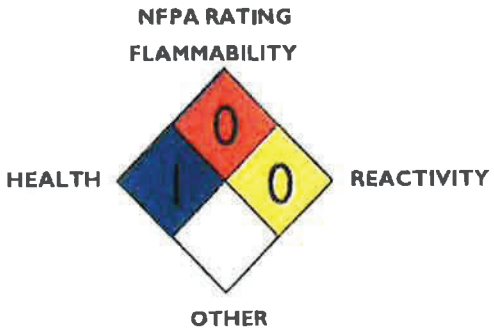
NOTES TO PHYSICIAN: Treat symptomatically. Treat symptoms as demonstrated by signs and distress in the patient.

## SECTION 5 - FIRE FIGHTING MEASURES

FIRE EXTINGUISHING MATERIALS: Use media appropriate for the surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: No unusual hazards.

SPECIAL FIRE-FIGHTING PROCEDURES: In case of fire wear full positive-pressure self-contained breathing apparatus and protective suit.



## SECTION 6 - ACCIDENTAL RELEASE MEASURES

WARNING: Any container expansion or rounding indicates pressure build-up. Use extreme caution. When opening, release pressure slowly through opening.

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used.

Small Spill: Mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill: Restrict access to the area. Provide adequate protective equipment and ventilation. Stop leak if without risk. Remove chemicals which can react with the spilled material. Add dry inert material to contain and absorb spilled material. Prevent entry into surface waters, sewers, basements or confined areas, dike if needed. Ensure that exposure to product is not at a concentration exceeding regulatory limits. Decontaminate the area thoroughly. Decontaminate all response equipment with soapy water before returning to service. Place all spill residue in a suitable container and seal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations, those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations), as appropriate.

## SECTION 7 - HANDLING AND STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Storage areas of this product should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store containers in a cool, dry location, away from direct sunlight, at temperatures between 50°F - 100°F. Keep container tightly closed when not in use.

## SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Ensure eyewash/safety shower station is available near where this product is used.

**EXPOSURE LIMITS/GUIDELINES:**

| CHEMICAL NAME | CAS# | EXPOSURE LIMITS IN AIR: ACGIH TLV TWA | ACGIH TLV STEL | OSHA PEL TWA | OTHER |
|---|---|---|---|---|---|
| PHOSPHONOBUTANE TRICARBOXYLIC ACID | 37971-36-1 | NE | NE | NE | NONE |
| MONOSODIUM PHOSPHATE | 7558-80-7 | NE | NE | NE | NONE |
| BENZOTRIAZOLE | 95-14-7 | NE | NE | NE | NONE |
| PHOSPHINOCARBOXYLIC ACID | 71050-62-9 | NE | NE | NE | NONE |

NE = Not Established

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132 and 1910.138) or equivalent standard of Canada, European Standard DIN EN 374, Australian Standards, relevant Japanese Standards, or EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection). If necessary, refer to appropriate Standards of Canada, EU, Australia, or Japan.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under U.S. Federal OSHA's Respiratory Protection Standard (1910.134-1998) or the regulations of various U.S. States, Canada, EU Member States, or those of Japan. Air-purifying respirators with dust/mist/fume filters are recommended if operations may produce mists or sprays from this product.

EYE PROTECTION: Chemical safety goggles. A face shield may also be necessary. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards.

SKIN PROTECTION: Use chemically-resistant, such as Butyl rubber, Nitrile or polyvinyl alcohol gloves when handling this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards. Use body protection appropriate for task (e.g. lab coat, overalls).

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| APPEARANCE and COLOR: | Clear light yellow liquid | VAPOR PRESSURE, mm Hg @ 20°C : | Not determined |
| ODOR : | Slight Organic | VAPOR DENSITY (Air=1.0): | Not determined |
| pH: | 2.0 - 4.0 | SPECIFIC GRAVITY@20°C (water=1): | 1.04 - 1.06 |
| MELTING/FREEZING POINT: | NA | SOLUBILITY IN WATER: | Complete |
| BOILING POINT: | > 212 °F (100 °C) | PARTITION COEFFICIENT(n-octanol/water) | Not established |
| FLASHPOINT: | Non-flammable | AUTOIGNITION TEMPERATURE: | Not established |
| EVAPORATION RATE (n-BuAc=1): | Not established | DECOMPOSITION TEMPERATURE: | Not established |
| FLAMMABLE LIMITS (in air by volume, %): | Not established | VISCOSITY: | Not established |

## SECTION 10 - STABILITY AND REACTIVITY

REACTIVITY: Not established

STABILITY: Stable

HAZARDOUS DECOMPOSITION: When heated to decomposition, product may emit toxic fumes of oxides of carbon, nitrogen, phosphorous and sulfur.

HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBLE MATERIALS: Bases

CONDITIONS TO AVOID: None known

## SECTION 11 - TOXICOLOGICAL INFORMATION

SUSPECTED CANCER AGENT: The components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

BIOLOGICAL EXPOSURE INDICES: Currently, Biological Exposure Indices (BEIs) have not been determined for the components of this product.

## SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: The components of this product will slowly degrade under ambient environmental conditions to other organic compounds. The following information is available for the main components of this product.

ECOLOGICAL DATA:
Fish: Flathead Minnow, LC50, 5359 ppm
Algae: No data available
Water Flea, LC50, Daphnia magna, 7071 ppm

BOD5 and COD: Material not expected to bioaccumulate.

## SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, those of Canada, Australia, EU Member States and/or Japan, as appropriate.

## SECTION 14 - TRANSPORTATION INFORMATION

US DOT - NOT REGULATED
ICAO/IATA - NOT REGULATED
IMO/IMDG - NOT REGULATED

## SECTION 15 - REGULATORY INFORMATION

### United States and International Regulations

**United States Regulations: U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title of the Superfund Amendments and Reauthorization Act, listed below:**

| CHEMICAL NAME | |
|---|---|
| PHOSPHONOBUTANE TRICARBOXYLIC ACID | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - NO |
| MONOSODIUM PHOSPHATE | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - NO |
| BENZOTRIAZOLE | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - NO |
| PHOSPHINOCARBOXYLIC ACID | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - NO |

**U.S. Regulations**

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.U.S.
CERCLA REPORTABLE QUANTITY (RQ): None
U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.
OTHER U.S. FEDERAL REGULATIONS:
SARA Title 311/312, Hazard Category: Acute Health: NO; Chronic: YES; Fire: NO; Reactive: NO; Sudden Release of Pressure: NO

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the Proposition 65 List.

**International Regulations**

CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL or NDSL Inventories
CANADIAN WHMIS CLASSIFICATION: Not classified.

This material or its components are listed (or considered as having been notified) on the European Inventory of Existing Chemical Substances (EINECS).

Other Inventory Lists:, Korea (TCCL), Australia (AISC), China (Draft), PICCS (Philippines-RA6969), Japan (ENCS METI/MOL).

## SECTION 16 - OTHER INFORMATION

PREPARED BY: Garratt Callahan
Revision Date: February 22, 2011 Supercedes: June 6, 2008

# GC FORMULA 314-T

Garratt CALLAHAN

# MATERIAL SAFETY DATA SHEET

## SECTION 1 - PRODUCT IDENTIFICATION

| | |
|---|---|
| PRODUCT NAME: | FORMULA 314-T |
| PRODUCT USE: | BIOCIDE |
| UN NUMBER: | 1479 |
| PROPER SHIPPING NAME: | OXIDIZING SOLID, N.O.S., 5.1, PGII, (1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN) |
| MANUFACTURER'S NAME: | Garratt-Callahan Company |
| ADDRESS: | 50 Ingold Road, Burlingame, CA 94010-2206 |
| EMERGENCY PHONE: | **North America: CHEMTREC: 1-800-424-9300**<br>**Outside North America: +1-703-527-3887** |
| BUSINESS PHONE: | Product Information: 650-697-5811 |
| MSDS NUMBER: | SD3314 |
| DATE OF REVISION: | 3/6/2012 |

## SECTION 2 - HAZARDS IDENTIFICATION

OXIDIZING SOLID, N.O.S. (1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN), 5.1, PGII

EU LABELING AND CLASSIFICATION: This product meets the definition of the following hazard class as defined by the European Economic Community Guidelines.

EU CLASSIFICATION: [Xn] Harmful; [C] Corrosive

EU RISK PHRASES: R8: Contact with combustible material may cause fire; R31: Contact with acids liberates toxic gas; R34: Causes burns.

EU SAFETY PHRASES: S8: Keep container dry; S17: Keep away from combustible materials; S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice; S36: Wear suitable protective clothing; S37: Wear suitable gloves; S39: Wear eye/face protection; S41: In case of fire and/or explosion do not breath fumes; S45: In case of accident or if you feel unwell, seek medical advice immediately.

**DANGER! THIS PRODUCT IS A NON-FLAMMABLE, WHITE TO OFF-WHITE TABLET WITH A FAINT HALOGEN ODOR. MAY CAUSE EYE AND SKIN BURNS. HARMFUL IF INGESTED OR SWALLOWED. MAY CAUSE RESPIRATORY TRACT IRRITATION.**

HEALTH EFFECTS AND RISKS FROM EXPOSURE:
ACUTE: Contact with skin and eyes will cause burning and irritation. Do not wear contact lenses when using this product. Ingestion will cause gastric distress and possible depression of the central nervous system.
CHRONIC: Repeated or prolonged exposure to this product can produce target organ damage. Repeated exposure of the eyes can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation can produce varying degrees of respiratory irritation or lung damage.
TARGET ORGANS:
ACUTE: Skin, eyes respiratory system.
CHRONIC: Skin, respiratory system

**HAZARDOUS MATERIAL IDENTIFICATION SYSTEM**

| | |
|---|---|
| HEALTH HAZARD (BLUE) | 3 |
| FLAMMABILITY HAZARD (RED) | 0 |
| REACTIVITY HAZARD (YELLOW) | 1 |

Hazard Scale
0=Minimal
1=Slight
2=Moderate
3=Serious
4=Severe
*=Chronic hazard

## SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

| Hazardous Ingredients | CAS# | EC# | ICSC# | WT % | GHS Hazard Statement |
|---|---|---|---|---|---|
| 1-BROMO-3-CHLORO-5,5-DIMETHYL-HYDANTOIN | 16079-88-2 | 240-230-0 | NE | 96% | HAZARD CLASSIFICATION: [Xn] HARMFUL, [C] CORROSIVE RISK PHRASES: R8, R31, R34 |

## SECTION 4 - FIRST AID MEASURES

Exposed individuals must be taken for medical attention if any adverse effect occurs. Take a copy of this MSDS to the health professional with the individual.

SKIN EXPOSURE: If this product contaminates the skin, begin decontamination with running water and soap. Minimum flushing time is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate the eyes. The exposed individual must seek medical attention if any adverse effect occurs.

EYE EXPOSURE: If vapors, mists, or sprays are generated by this product and enter the eyes, open the exposed individual's eyes while under gently running water. Use sufficient force to open the eyelids. Have the exposed individual "roll" their eyes. Minimum flushing time is for 15 minutes. The exposed individual must seek immediate medical attention.

INHALATION: If vapors, mists, or sprays generated by this product are inhaled, remove exposed individual to fresh air. Remove or cover gross contamination to avoid exposure to rescuers.

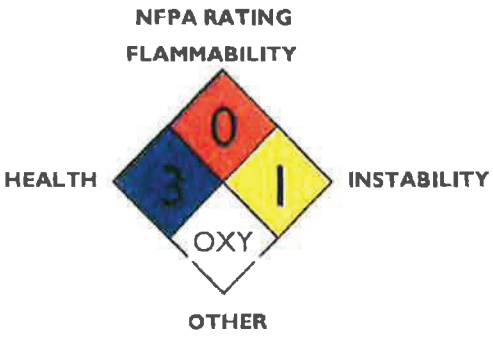
INGESTION: Routine use of this product is not expected to cause any situation which could lead to ingestion. If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT ASSISTANCE INFORMATION. Exposed individual must seek immediate medical attention. Never induce vomiting or give diluents (milk or water) by mouth to someone who is unconscious, having convulsions, or unable to swallow.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin and respiratory disorders, as well as conditions involving the "Target Organs" (see Section 2, Hazards Identification) which may be aggravated by prolonged exposures to this product. Exposed individual must seek immediate medical attention if any adverse effect occurs.

NOTES TO PHYSICIAN: Treat symptomatically. Treat symptoms as demonstrated by signs and distress in the patient.

## SECTION 5 - FIRE FIGHTING MEASURES

| | |
|---|---|
| FIRE EXTINGUISHING MATERIALS: | Water spray, fog or mist. Alcohol resistant foam. Do not use ammonium-phosphate (ABC), other dry chemical extinguishers or CO2. |
| UNUSUAL FIRE AND EXPLOSION HAZARDS: | Oxidizing material. Forms explosive mixtures with combustible organic or other easily oxidizable materials. May release hydrogen bromide or bromine gas, nitrogen oxides, hydrogen chloride when wet. Fire causes formation of toxic gases. |
| SPECIAL FIRE-FIGHTING PROCEDURES: | Wear self-contained breathing apparatus and full protective gear. Keep run-off water out of sewers and water sources. Dike for water control. |



## SECTION 6 - ACCIDENTAL RELEASE MEASURES

WARNING: Any drum expansion or rounding indicates pressure build-up. Use extreme caution. When opening, release pressure slowly through lifting edge of lid carefully.

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used.

Small Spill: Collect and place in an appropriate waste disposal container.

Large Spill: Non-flammable corrosive oxidizing solid. Restrict access to the area. Avoid contact with water. Provide adequate protective equipment and ventilation. Stop leak if without risk. Remove chemicals which can react with the spilled material. Use DRY earth sand or other non-combustible material to collect and dry product. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into surface waters, sewers, basements or confined areas, dike if needed. Decontaminate the area thoroughly. Decontaminate all response equipment with soapy water before returning to service. Place all spill residue in a suitable container and seal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations, those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations), as appropriate.

## SECTION 7 - HANDLING AND STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Storage areas of this product should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store containers in a cool, dry location, away from direct sunlight, heat, sparks or open flame. Keep container tightly closed when not in use. Storage class: oxidizer storage.

## SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Eyewash/safety shower station is recommended to be available near where this product is used.

**EXPOSURE LIMITS/GUIDELINES:**

| CHEMICAL NAME | CAS# | EXPOSURE LIMITS IN AIR: ACGIH TLV TWA | ACGIH TLV STEL | OSHA PEL TWA | OTHER |
|---|---|---|---|---|---|
| 1-BROMO-3-CHLORO-5,5-DIMETHYL-HYDANTOIN | 16079-88-2 | NE | NE | NE | NONE |

NE = Not Established

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above, if applicable. Air-purifying respirators with dust/mist/fume filters are recommended if operations may produce mists or sprays from this product.

EYE PROTECTION: Chemical safety goggles. A face shield may also be necessary.

SKIN PROTECTION: Use chemically-resistant gloves (rubber, neoprene or pvc) when handling this product. Wear apron or protective clothing in case of contact.

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| APPEARANCE and COLOR: | White to off-white tablet | VAPOR PRESSURE, mm Hg @ 20°C : | NA |
| ODOR : | Slight odor Halogen | VAPOR DENSITY (Air=1): | NA |
| pH: | 3.5 @ 0.15% | SPECIFIC GRAVITY@20°C (water=1): | NA |
| MELTING/FREEZING POINT: | 145-160°C | SOLUBILITY IN WATER: | Slightly |
| BOILING POINT: | NA | PARTITION COEFFICIENT(n-octanol/water) | Not established |
| FLASHPOINT: | Non-flammable | AUTOIGNITION TEMPERATURE: | NA |
| EVAPORATION RATE (n-BuAc=1): | NA | DECOMPOSITION TEMPERATURE: | Not established |
| FLAMMABLE LIMITS (in air by volume, %): | NA | VISCOSITY: | NA |
| | | VOLATILE ORGANIC COMPOUNDS (%) | None |

## SECTION 10 - STABILITY AND REACTIVITY

REACTIVITY: Not established

STABILITY: Stable under normal temperature condition. Avoid moisture.

HAZARDOUS DECOMPOSITION: Toxic gases/vapors/fumes of: Hydrogen Bromide, Bromine, Hydrogen chloride, chlorine, oxides of carbon, Nitrogen.

HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBLE MATERIALS: Hydrocarbons, strong acids, strong alkalies, strong oxides, strong reducing agents.

CONDITIONS TO AVOID: Avoid contact with oxidizers or reducing agents. Avoid contact with acids and alkalies. Avoid heat, flames and other sources of ignition. Avoid moisture.

## SECTION 11 - TOXICOLOGICAL INFORMATION

1-BROMO-3-CHLORO-5,5-DIMETHYL-HYDANTOIN:
Oral: LD50: rats, 578 mg/kg
Dermal: LD50: rabbits, 2000mg/kg
Toxicological Information: Ames test negative
Inhalation: May cause irritation to the respiratory system.

Carcinogenicity: None of the components of this product are listed by the NTP, IARC, or regulated by OSHA as carcinogens.

BIOLOGICAL EXPOSURE INDICES: Currently, Biological Exposure Indices (BEIs) have not been determined for the components of this product.

## SECTION 12 - ECOLOGICAL INFORMATION

Environmental Fate:
ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: Not determined
COD: 1.005 g/g. Material is expected to present a low bioaccumulation potential.
Environmental Toxicity:
ECOLOGICAL DATA:
Fish: LC50: 96 hr = .87 mg/l
Algae: No Data
Daphnia: LC50: 48 hr = .48 mg/l
Acute Toxicity : LC50: 96hours, 640 mg/l American Oyster.

## SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, those of Canada, Australia, EU Member States and/or Japan, as appropriate. Absorb in vermiculite or dry sand.

## SECTION 14 - TRANSPORTATION INFORMATION

DOT
Proper Shipping Name: OXIDIZING SOLID, N.O.S., 5.1, PGII, (1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN)
Hazard Class: 5.1
UN No.: 1479
Packing Group: II
Transport Description: UN1479, OXIDIZING SOLID, N.O.S., 5.1, PGII, (1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN)
ERG 140


IMDG/IMO
Class: 5.1
Packing Group: II
UN No.: 1479
IMO Labeling and Marking: 5.1
Proper Shipping Name: UN1479, OXIDIZING SOLID, N.O.S., 5.1, PGII, (1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN)

IATA/ICAO
Class: 5.1
Packing Group: II
UN No.: 1479
IATA/ICAO Labeling: 5.1
Proper Shipping Name: UN1479, OXIDIZING SOLID, N.O.S., 5.1, PGII, (1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN)

PRODUCT REQUIRES OXIDIZER LABEL

## SECTION 15 - REGULATORY INFORMATION

### United States and International Regulations

**United States Regulations: U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting as listed below, requirements of Sections 302, 304, and 313 of Title of the Superfund Amendments and Reauthorization Act:**

| CHEMICAL NAME | |
|---|---|
| 1-BROMO-3-CHLORO-5,5-DIMETHYL-HYDANTOIN | SARA 302 (40CFR 355, APPENDIX A) - NO<br>SARA 304 (40CFR TABLE 302.4) - NO<br>SARA 313 (40CFR 372.65) - NO |

**U.S. Regulations**

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.
U.S. CERCLA REPORTABLE QUANTITY (RQ): Not listed
U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.
OTHER U.S. FEDERAL REGULATIONS:
SARA TITLE 311/312 HAZARD CATEGORY: ACUTE: YES CHRONIC: NO FIRE: YES REACTIVITY: NO

STATE REGULATIONS
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the Proposition 65 List.

**International Regulations**

CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL or NDSL Inventories
CANADIAN WHMIS CLASSIFICATION: CLASS D; Div2 Material causing other Toxic effects (Very Toxic)
CLASS E: Corrosive Material
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.
This material or all of its components are listed on the Canadian Domestic Substances List (DSL).
This material or all of its components are listed (or considered as having been notified) on the European Inventory of Existing Chemical Substances.
Other Inventory Lists:, Korea (TCCL), Australia (AISC), China (Draft), PICCS (Philippines-RA6969), Japan (ENCS METI/MOL).

## SECTION 16 - OTHER INFORMATION

Formula 314-T is registered with the NSF to the NSF International Registration Guidelines for Proprietary Substances and Nonfood Compounds for category codes G5, G7, etc.; with NSF Reg. No. 113139.

PREPARED BY: Garratt Callahan
REVISION DATE: March 06, 2012 SUPERCEDES: September 14, 2010

# GC FORMULA 315

Garratt CALLAHAN

# MATERIAL SAFETY DATA SHEET

## SECTION 1 - PRODUCT IDENTIFICATION

| | |
|---|---|
| PRODUCT NAME: | FORMULA 315 |
| PRODUCT USE: | BIOCIDE |
| RESTRICTIONS ON USE: | Refer to label, available technical information, and other appropriate sections of this SDS. |
| UN NUMBER: | 3265 |
| PROPER SHIPPING NAME: | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE), 8, PG II |
| MANUFACTURER'S NAME: | Garratt-Callahan Company |
| ADDRESS: | 50 Ingold Road, Burlingame, CA 94010-2206 |
| EMERGENCY PHONE: | **North America: CHEMTREC: 1-800-424-9300**<br>**Outside North America: +1-703-527-3887** |
| BUSINESS PHONE: | Product Information: 650-697-5811 |
| MSDS NUMBER: | SD3315 |
| DATE OF REVISION: | 5/21/2013 |

## SECTION 2 - HAZARDS IDENTIFICATION

GHS LABELING AND CLASSIFICATION:

SIGNAL WORD: WARNING

GHS HAZARD STATEMENT:
H302: Harmful if swallowed.
H315: Causes skin irritation.
H320: Causes eye irritation.
H335: May cause respiratory irritation.

GHS PREVENTATIVE STATEMENTS:
P101: If medical advice is needed, have product container or label at hand.
P102: Keep out of reach of children.
P103: Read label before use.
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P264: Wash all exposed skin/hair thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

**DANGER! THIS PRODUCT IS A NON-FLAMMABLE, CLEAR YELLOW GREEN LIQUID WITH A PUNGENT ODOR. MAY CAUSE EYE AND SKIN BURNS. HARMFUL IF SWALLOWED. MAY CAUSE RESPIRATORY TRACT IRRITATION. ENVIRONMENTAL HAZARDS: Release of this product to the environment is expected to cause harm to plants and animals. If accidentally released, precautions must be taken to protect the environment.**

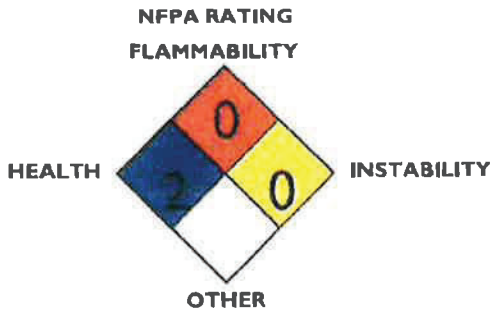
SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of overexposure for this product are by inhalation of mists or contact with skin or eyes. The symptoms of overexposure are described in the following paragraphs.

HEALTH EFFECTS AND RISKS FROM EXPOSURE:
ACUTE: Contact with skin and eyes will cause burning and irritation. Do not wear contact lenses when using this product. Ingestion will cause gastric distress and possible depression of the central nervous system.
CHRONIC: Repeated or prolonged exposure to this product can produce target organ damage. Repeated exposure of the eyes can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation can produce varying degrees of respiratory irritation or lung damage.
TARGET ORGANS:
ACUTE: Skin, eyes, respiratory, gastrointestinal systems.
CHRONIC: Skin, eyes, respiratory, gastrointestinal systems.

**HAZARDOUS MATERIAL IDENTIFICATION SYSTEM**

| | |
|---|---|
| HEALTH HAZARD (BLUE) | 2 |
| FLAMMABILITY HAZARD (RED) | 0 |
| REACTIVITY HAZARD (YELLOW) | 0 |

Hazard Scale
0=Minimal
1=Slight
2=Moderate
3=Serious
4=Severe
*=Chronic hazard




## SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

| Hazardous Ingredients | CAS# | EC# | ICSC# | WT % |
|---|---|---|---|---|
| MAGNESIUM NITRATE | 10377-60-3 | 233-826-7 | 1041 | 1-3 |
| 5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE | 26172-55-4 | 247-500-7 | NA | 1-2 |
| 2-METHYL-4-ISOTHIAZOLIN-3-ONE | 2682-20-4 | 220-239-6 | NA | <1 |
| MAGNESIUM CHLORIDE | 7786-30-3 | 232-094-6 | 0764 | <1 |

## SECTION 4 - FIRST AID MEASURES

P312: Call a POISON CENTER or doctor/physician if you feel unwell. Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

SKIN EXPOSURE: P302+P352: IF ON SKIN: Wash with soap and water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. The contaminated individual must seek medical attention if any adverse effect occurs. P362: Take off contaminated clothing and wash before reuse.

EYE EXPOSURE: P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing. If vapors, mists, or sprays generated by this product enter the eyes, open contaminated individual's eyes while under gently running water. Use sufficient force to open eyelids. Have contaminated individual "roll" eyes. Minimum flushing is for 15 minutes. Contaminated individual must seek immediate medical attention. P337+P313: If eye irritation persists get medical advice/attention.

INHALATION: If vapors, mists, or sprays generated by this product are inhaled, remove contaminated individual to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers. P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

INGESTION: P301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. P330: Rinse mouth. Routine use of this product is not expected to cause any situation which could lead to ingestion.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin and respiratory disorders, as well as conditions involving the "Target Organs" (see Section 3, Hazard Identification) may be aggravated by prolonged overexposures to this product.

NOTES TO PHYSICIAN: Treat symptoms as demonstrated by signs and distress in the patient.

## SECTION 5 - FIRE FIGHTING MEASURES

| | |
|---|---|
| SUITABLE (AND UNSUITABLE) EXTINGUISHING MATERIALS: | Use media appropriate for the surrounding fire. |
| SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: | Non-Flammable Liquid.<br>Explosion hazards in Presence of Various Substances: Non-Explosive in presence of open flames and sparks, or shocks.<br>Special Remarks on Explosion Hazards: None known |
| SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS: | Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas. |

## SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used.

Small Spill: Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill: Corrosive liquid.
Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas, dike if needed. Ensure that the product is not at a concentration level above regulated concentration. Decontaminate the area thoroughly. Decontaminate all response equipment with soapy water before returning to service. Place all spill residue in a suitable container and seal.

## SECTION 7 - HANDLING AND STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Storage areas of this product should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store containers in a cool, dry location, away from direct sunlight, at temperatures between 50°F - 104°F. Keep container tightly closed when not in use. P405: Store locked up. P403+P233: Store in a well ventilated place. Keep container tightly closed.

## SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation. Eyewash/safety shower station is recommended to be available near where this product is used/stored.

**EXPOSURE LIMITS/GUIDELINES:**

| CHEMICAL NAME | CAS# | EXPOSURE LIMITS IN AIR | | | |
|---|---|---|---|---|---|
| | | ACGIH TLV | | OSHA PEL | OTHER |
| | | TWA | STEL | TWA | |
| MAGNESIUM NITRATE | 10377-60-3 | NE | NE | NE | NE |
| 5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE | 26172-55-4 | NE | NE | NE | NE |
| 2-METHYL-4-ISOTHIAZOLIN-3-ONE | 2682-20-4 | NE | NE | NE | NE |
| MAGNESIUM CHLORIDE | 7786-30-3 | NE | NE | NE | NE |

NE = Not Established

**INGESTION:** P270: Do not eat, drink or smoke when using this product.

**RESPIRATORY PROTECTION:** P261: Avoid breathing dust/fume/gas/mist/vapours/spray. P271: Use only outdoors or in a well-ventilated area. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. Air-purifying respirators with dust/mist/fume filters are recommended if operations may produce mists or sprays from this product.

**EYE PROTECTION:** Safety glasses or safety goggles. If splashing is anticipated, a face shield is recommended. P280: Wear protective gloves/protective clothing/eye protection/face protection.

**SKIN PROTECTION:** HAND PROTECTION: P264: Wash all exposed skin/hair thoroughly after handling. P280: Wear protective gloves/protective clothing/eye protection/face protection. Use chemically-resistant gloves when handling this product.
BODY PROTECTION: Use body protection appropriate for task (e.g., lab coat, overalls, gloves).

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| APPEARANCE and COLOR: | Clear yellow/green liquid | VAPOR PRESSURE, mm Hg @ 20°C : | Not established |
| ODOR : | Pungent | VAPOR DENSITY (Air=1): | Not established |
| ODOR THRESHOLD: | Not established | RELATIVE DENSITY@20°C (water=1): | 1.0 - 1.10 |
| pH: | 3.0 - 6.5 | SOLUBILITY IN WATER: | Complete |
| MELTING/FREEZING POINT: | NA | PARTITION COEFFICIENT(n-octanol/water) | Not established |
| BOILING POINT: | 100°C (212°F) | AUTOIGNITION TEMPERATURE: | NA |
| FLASHPOINT: | Non-flammable | DECOMPOSITION TEMPERATURE: | Not established |
| EVAPORATION RATE (n-BuAc=1): | < 1 | VISCOSITY: | Not established |
| FLAMMABILITY (SOLID/GAS): | NA | VOLATILE ORGANIC COMPOUNDS (%): | Not established |
| FLAMMABLE LIMITS (in air by volume, %): | NA | | |

## SECTION 10 - STABILITY AND REACTIVITY

**REACTIVITY:** Not established

**STABILITY:** Stable

**POSSIBILITY OF HAZARDOUS REACTIONS:** Will not occur.

**CONDITIONS TO AVOID:** None known.

**INCOMPATIBLE MATERIALS:** Oxidizing agents, reducing agents, amines, mercaptans.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Thermal decomposition may yield the following: Hydrogen chloride, oxides of sulfur and nitrogen.

## SECTION 11 - TOXICOLOGICAL INFORMATION

Ceriodaphnia dubia (waterflea): 48hr, LC50s: 8.77 ppm
Ceriodaphnia dubia (waterflea): 96hr, LC50s: 7.88 ppm
Pimephales promelas (fathead minnow): 48hr, LC50s: 9.84 ppm
Pimephales promelas (fathead minnow): 96hr, LC50s: 9.56 ppm

SUSPECTED CANCER AGENT: The components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product is very irritating to skin, eyes and respiratory system.
SENSITIZATION TO THE PRODUCT: This product may cause allergic skin reactions (e.g., rashes, welts) in sensitive individuals.

## SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: The components of this product will slowly degrade under ambient environmental conditions to other organic compounds.
ECOLOGICAL DATA:
No data available

Material is considered biodegradeable.

**BIOLOGICAL EXPOSURE INDICES:** Currently, Biological Exposure Indices (BEIs) have not been determined for the components of this product.

## SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL: P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

## SECTION 14 - TRANSPORTATION INFORMATION

**PROPER SHIPPING NAME**

**DOT:** UN3265, CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE), 8, PG II
Emergency Response Guidebook, Guide No.: 153
Passenger Aircraft Qty: 1L
Cargo Aircraft Qty: 30L


**IMDG/IMO:** UN3265, CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE), 8, PG II

**IATA/ICAO:** UN3265, CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE), 8, PG II

**ENVIRONMENTAL HAZARDS (i.e., MARINE POLLUTANT):** No data available for this product.

**TRANSPORT IN BULK (according to annex II marpol 73/78 and the IBC code):** Not applicable

**SPECIAL PRECAUTIONS FOR USER:** None known.

PRODUCT REQUIRES CORROSIVE LABEL

## SECTION 15 - REGULATORY INFORMATION

### United States and International Regulations

**United States Regulations: U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting as listed below, requirements of Sections 302, 304, and 313 of Title of the Superfund Amendments and Reauthorization Act:**

| CHEMICAL NAME | |
|---|---|
| MAGNESIUM NITRATE | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - YES |
| 5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - NO |
| 2-METHYL-4-ISOTHIAZOLIN-3-ONE | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - NO |
| MAGNESIUM CHLORIDE | SARA 302 (40 CFR 355, Appendix A) - NO<br>SARA 304 (40 CFR Table 302.4) - NO<br>SARA 313 (40 CFR 372.65) - NO |

**U.S. Regulations**

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.
U.S. CERCLA REPORTABLE QUANTITY (RQ): Not Listed.
TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.
SARA TITLE III Section 311/312 Hazard Category: Acute: YES; Chronic: NO; Fire: NO; Reactive: NO; Sudden Release of Pressure: NO

STATE REGULATIONS:
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the Proposition 65 List.

**International Regulations**

CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL Inventories or are exempt from listing.
CANADIAN WHMIS CLASSIFICATION: Not classified.

## SECTION 16 - OTHER INFORMATION

**PREPARED BY:** **GARRATT CALLAHAN**

**DATE OF REVISION:** 5/21/2013 Supercedes: 6/8/2012

Formula 315 is EPA-registered; with EPA Reg. No. 8540-23. Refer to the approved label for details.

# WEST R-630

HMIS RATING:
HEALTH 1
FLAMMABILITY 0
REACTIVITY 0
OTHER C

# Safety Data Sheet
# WEST R-630

## SECTION 1: Identification

### 1.1 Product identifier

| | |
|---|---|
| Product name | WEST R-630 Sulfite |
| Product number | R-630 |

### 1.2 Recommended use

An aqueous solution of sodium and potassium sulfites, bisulfites and metabisulfites designed specifically for halogen removal in process water systems.

### 1.3 Supplier's details

| | |
|---|---|
| Name | Water & Energy Systems Technology, Inc. |
| Address | 13109 Arctic Cr.<br>Santa Fe Springs, CA 90670 |
| Telephone | (562) 921-5191 |

### 1.4 Emergency phone number(s)

Chem-Tel (U.S.): (800) 255-3924

## SECTION 2: Hazard identification

### 2.1 Classification of the substance or mixture

**GHS classification in accordance with OSHA (29 CFR 1910.1200)**
- Skin corrosion/irritation (chapter 3.2), Cat. 3
- Eye damage/irritation (chapter 3.3), Cat. 2B

### 2.2 GHS label elements, including precautionary statements

| | |
|---|---|
| **Signal word** | **Warning** |
| **Hazard statement(s)** | |
| H316 | Causes mild skin irritation |
| H320 | Causes eye irritation |
| **Precautionary statement(s)** | |
| P332+P313 | If skin irritation occurs: Get medical advice/attention. |
| P264 | Wash hands thoroughly after handling. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. |
| P337+P313 | If eye irritation persists: Get medical advice/attention. |

## SECTION 3: Composition/information on ingredients

### 3.1 Mixtures

This product does not contain any hazardous materials under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

**Trade secret statement (OSHA 1910.1200(i))**
Specific chemical identity and/or exact percentage of composition has been withheld as a trade secret.

## SECTION 4: First-aid measures

### 4.1 Description of necessary first-aid measures

| | |
|---|---|
| General advice | Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. |
| If inhaled | Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention. |
| In case of skin contact | Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse. |
| In case of eye contact | Flush eye with water for 15 minutes. Get medical attention. |
| If swallowed | Do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. |

Personal protective equipment for first-aid responders
No data available.

### 4.2 Most important symptoms/effects, acute and delayed
No data available.

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary
No data available.

## SECTION 5: Fire-fighting measures

### 5.1 Suitable extinguishing media
No data available.

### 5.2 Specific hazards arising from the chemical
No data available.

### 5.3 Special protective actions for fire-fighters
No special fire fighting procedures.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures
Wear appropriate personal protective equipment as specified in Section 8.

### 6.2 Environmental precautions
Do not flush to sewer.

**6.3 Methods and materials for containment and cleaning up**
No data available.

## SECTION 7: Handling and storage

**7.1 Precautions for safe handling**
Use with adequate ventilation. Follow all SDS/label precautions even after container is emptied because they may retain product residues.

**7.2 Conditions for safe storage, including any incompatibilities**
Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

## SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**
No exposure limits noted for ingredient(s).

**8.2 Appropriate engineering controls**
Local exhaust ventilation may be necessary to control any air containments to within their PELs (TLVs) during the use of this product.

**8.3 Individual protection measures, such as personal protective equipment (PPE)**

**Eye/face protection**
Wear safety glasses with side shields (or goggles) and a face shield.

**Skin protection**
Nitrile rubber, PVC, or Neoprene gloves are suitable protective materials.

**Body protection**
Where splashing is possible, full chemically resistant protective clothing, rubber apron and boots are required.

**Respiratory protection**
NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.

**Thermal hazards**
No data available.

**Environmental exposure controls**
No data available.

## SECTION 9: Physical and chemical properties

**Information on basic physical and chemical properties**

| | |
|---|---|
| Appearance/form | Clear pink liquid |
| Odor | No appreciable odor. |
| Odor threshold | No data available. |
| pH | ~6.5 |
| Melting point/freezing point | No data available. |
| Initial boiling point and boiling range | 212 F |

**Safety Data Sheet**
**WEST R-630**

| | |
|---|---|
| Flash point | No data available. |
| Evaporation rate | <1 (butyl acetate = 1) |
| Flammability (solid, gas) | No data available. |
| Vapor pressure | No data available. |
| Vapor density | No data available. |
| Relative density | 1.251 |
| Solubility(ies) | Water Soluble |
| Partition coefficient: n-octanol/water | No data available. |
| Auto-ignition temperature | No data available. |
| Decomposition temperature | No data available. |
| Viscosity | No data available. |
| Explosive properties | No data available. |
| Oxidizing properties | No data available. |

## SECTION 10: Stability and reactivity

**10.1 Reactivity**
No data available.

**10.2 Chemical stability**
Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**
No data available.

**10.4 Conditions to avoid**
Generation of heat by reaction with water or acids.

**10.5 Incompatible materials**
Acids, oxidizing materials, halogen compounds, copper, zinc and galvanized metals.

**10.6 Hazardous decomposition products**
Carbon monoxide, carbon dioxide, ammonia, and oxides of nitrogen.

## SECTION 11: Toxicological information

**Information on toxicological effects**

**Acute toxicity**
No data available.

**Skin corrosion/irritation**
No data available.

**Serious eye damage/irritation**
No data available.

**Respiratory or skin sensitization**
No data available.

**Germ cell mutagenicity**
No data available.

**Carcinogenicity**

This product's ingredients are not found in the federal or Cal OSHA NTP, or IARC lists of suspected cancer causing agents.

**Reproductive toxicity**
No data available.

**STOT-single exposure**
No data available.

**STOT-repeated exposure**
No data available.

**Aspiration hazard**
No data available.

## SECTION 12: Ecological information

**Toxicity**
No data available.

**Persistence and degradability**
No data available.

**Bioaccumulative potential**
No data available.

**Mobility in soil**
No data available.

**Results of PBT and vPvB assessment**
No data available.

## SECTION 13: Disposal considerations

**Disposal of the product**
Dispose of all waste in accordance with federal, state, and local regulations.

**Disposal of contaminated packaging**
Dispose of as unused product.

**Waste treatment**
No data available.

**Sewage disposal**
No data available.

## SECTION 14: Transport information

**DOT (US)**
Proper Shipping Name: D.O.T. NONREGULATED WATER TREATMENT LIQUID COMPOUND

# Safety Data Sheet
# WEST R-630

## SECTION 15: Regulatory information

**Safety, health and environmental regulations specific for the product in question**

**SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)**
**FIRE:** NO **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** NO

## SECTION 16: Other information

**Further information/disclaimer**
The information contained herein is provided in good faith and believed to be correct as of the date hereof. WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that the individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting in the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.